A CHILTON PUBLICATION

The Iron Age

98th ANNUAL REVIEW & METAL FACTS ISSUE

January 1, 1953

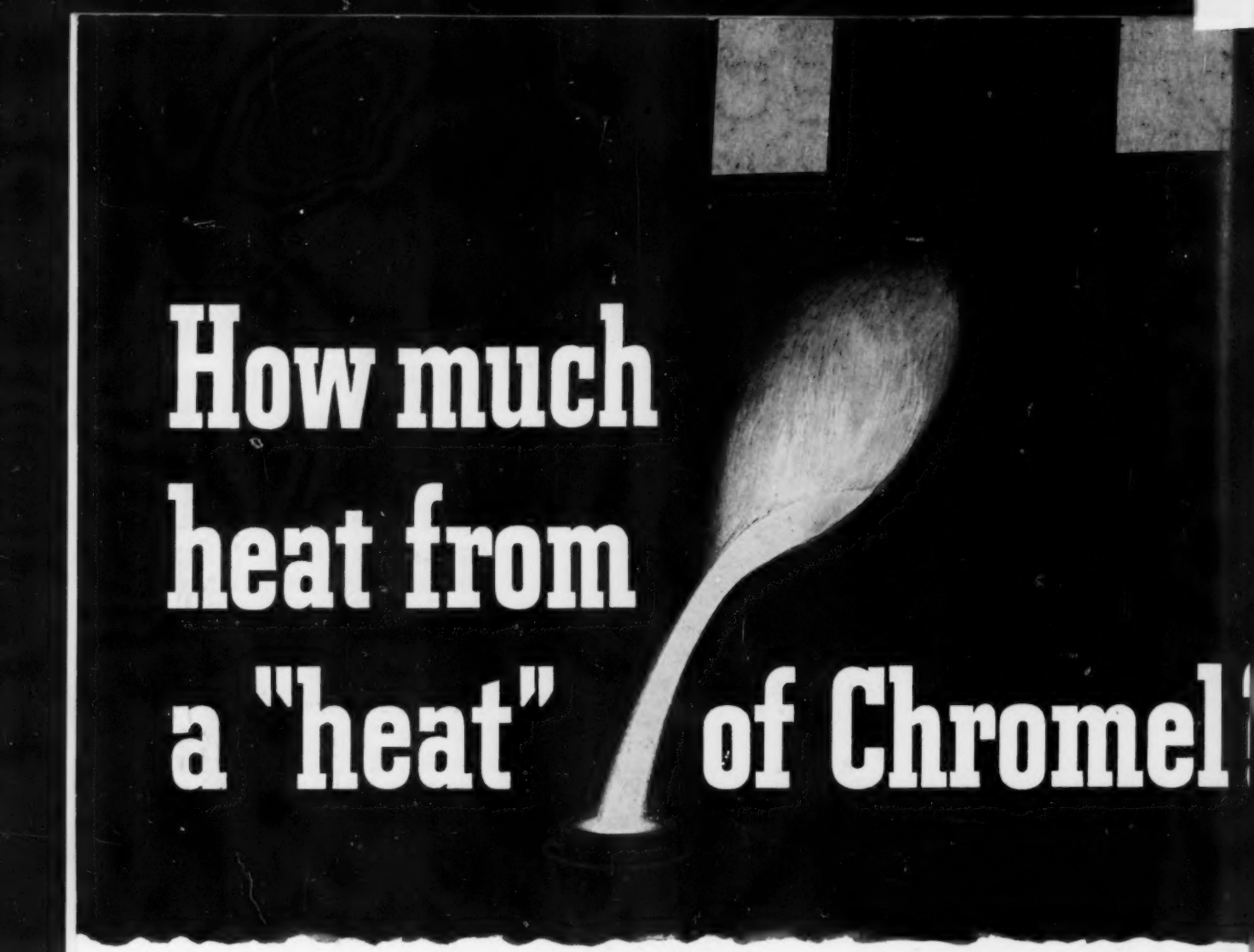
UNIV. OF MICHIGAN
JAN 5 1953
EAST ENGINEERING

Progress In Steel

For the past three years Pittsburgh Steel Company's "Program of Progress" has been directed toward the goal of increasing its finished product capacity 82% and ingot capacity 48%. A major portion of this $60-million program of expansion and product diversification has been completed. The remainder will be finished during 1953 bringing with it broader service to customers, steadier employment to workers and greater earning potential to shareholders. The year 1953 shows promise of becoming the greatest in the history of Pittsburgh Steel Company.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania



How much heat from a "heat" of Chromel?

You've seen molten metal before . . . but chances are you've never seen a "heat" that's more closely controlled as to composition and quality than the one you see above. For this is a heat of Hoskins Chromel . . . the *original* nickel-chromium alloy that *first* made electrical heating practical. Into it go precise amounts of the purest raw materials obtainable . . . mixed, melted, and poured in exactly timed cycles.

Heating elements made of Hoskins Chromel give long life service in industrial electric furnaces, home appliances.

Spark plugs equipped with Hoskins electrode alloys give long dependable service wherever they're used.

Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.

And from it, ultimately, will come approximately 1200 pounds of fine finished material . . . smooth, bright, durable wire or ribbon produced to a specified resistivity for long, dependable service as heating elements or cold resistors in countless different electrical devices.

Chromel, however, is only one of many specialized, quality-controlled alloys developed and produced by Hoskins. Others include: Alloy 502 . . . used throughout industry for a wide range of heat resistant mechanical applications. Spark plug electrode alloys . . . which have become universally accepted standards of quality and durability. Alloy 717 . . . used in facing engine valves for longer life and improved service. And, of course, there are Hoskins Chromel-Alumel thermocouple alloys for industrial furnaces and jet engines . . . unconditionally guaranteed to register true temperature-e.m.f. values within close specified limits.

HOSKINS

MANUFACTURING COMPANY

4445 LAWTON AVENUE • DETROIT 8, MICHIGAN

Chromel® NICKEL CHROMIUM WIRE

THE IRON AGE

Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N. Y. Murray Hill 5-8600

GEORGE T. HOOK, Publisher

TOM C. CAMPBELL, Editor

EDITORIAL STAFF

Managing Editor George F. Sullivan
Technical Editor Darwyn I. Brown
News-Markets Editor Wm. V. Packard
Asst. Technical Editor W. G. Patton
Machinery Editor E. C. Beaudet
Asst. News Editor Theodore Metaxas
Associate Editors: H. W. Van Camp, F. J. Winters, R. L. Hatschek, W. B. Olsen, G. G. Carr; Assistant Editors: E. C. Kellogg, J. J. Obrzut; Art Director: Carl Cerminaro; Regional Editors: K. W. Bennett, Chicago; R. D. Raddant, Detroit; Robert M. Lorz, Cleveland; J. B. Delaney, Pittsburgh; T. M. Rohan, San Francisco; G. H. Baker, A. K. Rannells, R. M. Stroupe, Washington; Editorial Assistants: L. Brass, M. Perrone, C. M. Markart; Correspondents: F. L. Allen, Birmingham; N. Levenson, Boston; R. M. Edmonds, St. Louis; James Douglas, Seattle; Jack Adams, Los Angeles; F. Sanderson, Toronto; F. H. Harley, London, England; Chilton Editorial Board: Paul Wooton, Washington.

BUSINESS STAFF

CHARLES R. LIPPOLD
Director of Advertising Sales

Production Manager B. H. Hayes
Director of Research Oliver Johnson
Circulation Mgr. William M. Coffey
Promotion Manager James A. Crites
Asst. Dir. of Research Wm. Laimbeer

REGIONAL BUSINESS MANAGERS

Chicago 3.....Stanley J. Smith
10 S. LaSalle St. Franklin 2-0203
Cleveland 14.....Robert W. Watts
1016 National City Bank Bldg. Main 1-2263
Columbus 9, Ohio.....Harry G. Mumm
1849 Franklin Park South Evergreen 9245
Detroit 2.....Peirce Lewis
103 Pallister Ave. Trinity 1-3120
Los Angeles 28.....R. Raymond Kay
2420 Cheremoya Ave. Granite 0741
New York 17....C. H. Ober, C. T. Post
100 E. 42nd St., Murray Hill 5-8600
Philadelphia 39.....B. L. Herman
56th & Chestnut Sts. Granite 4-5600
Pittsburgh 22.....J. M. Spackman
814 Park Bldg. Atlantic 1-1831
W. Hartford 7.....Paul Bachman
62 LaSalle Rd. Hartford 32-0486

OTHER EDITORIAL OFFICES

San Francisco 3.....1355 Market St.
Washington 4.....National Press Bldg.
Circulation Representatives: Thomas Scott, James Richardson.
One of the Publications Owned and Published by Chilton Co., Inc., Chestnut & 56th Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

Vice-Presidents: Everit B. Terhune, P. M. Fahrendorf, G. C. Buzby, Harry V. Duffy; William H. Vallar, Treasurer; John Blair Moffett, Secretary; George T. Hook, Maurice E. Cox, Tom C. Campbell, Frank P. Tighe, L. V. Rowlands, Directors.

George Maiswinkle, Asst. Treasurer.

Indexed in the Industrial Arts Index and the Engineering Index.

Society of Business Magazine Editors

Controlled Circulation Audit

National Business Publications

Copyright, 1953, by Chilton Co. (Inc.)

1953's Challenge To You

HAVE you been worrying about where your business is headed this year? Do the whims of buyers distress you? Do you fear things are going to be worse than predictions indicate? Do you fret about over-capacity, deflation and lack of markets?

If these fears harass you, you have made a good start for 1953. But it is only a start. On the surface, business will do nicely in 1953. Metals production and consumption will be good with no serious decline in prospect.

Machine tool activity will be lower but volume will not be disappointing, what with defense and civilian output at a high level.

Forging, stamping and metal fabricating are not going to the doldrums in 1953. Materials handling will play a stellar role if firms are to keep costs in check.

All these trends you have expected. You can plan on them for your 1953 program. Not crystal clear are some trends which may scare you. Perhaps you need a little shaking up. Are you still riding along accepting orders, or have you set up a new sales technique? Have your customers seen your salesmen? Do they know you mean business? That you know how to sell? That you want to give service?

What new products are you planning for 1953? What can they do for your customer's costs? For his product? For the public generally? Are the prices right? Can volume be raised with a rock-bottom price? Do you know why your product has sold—or why it hasn't?

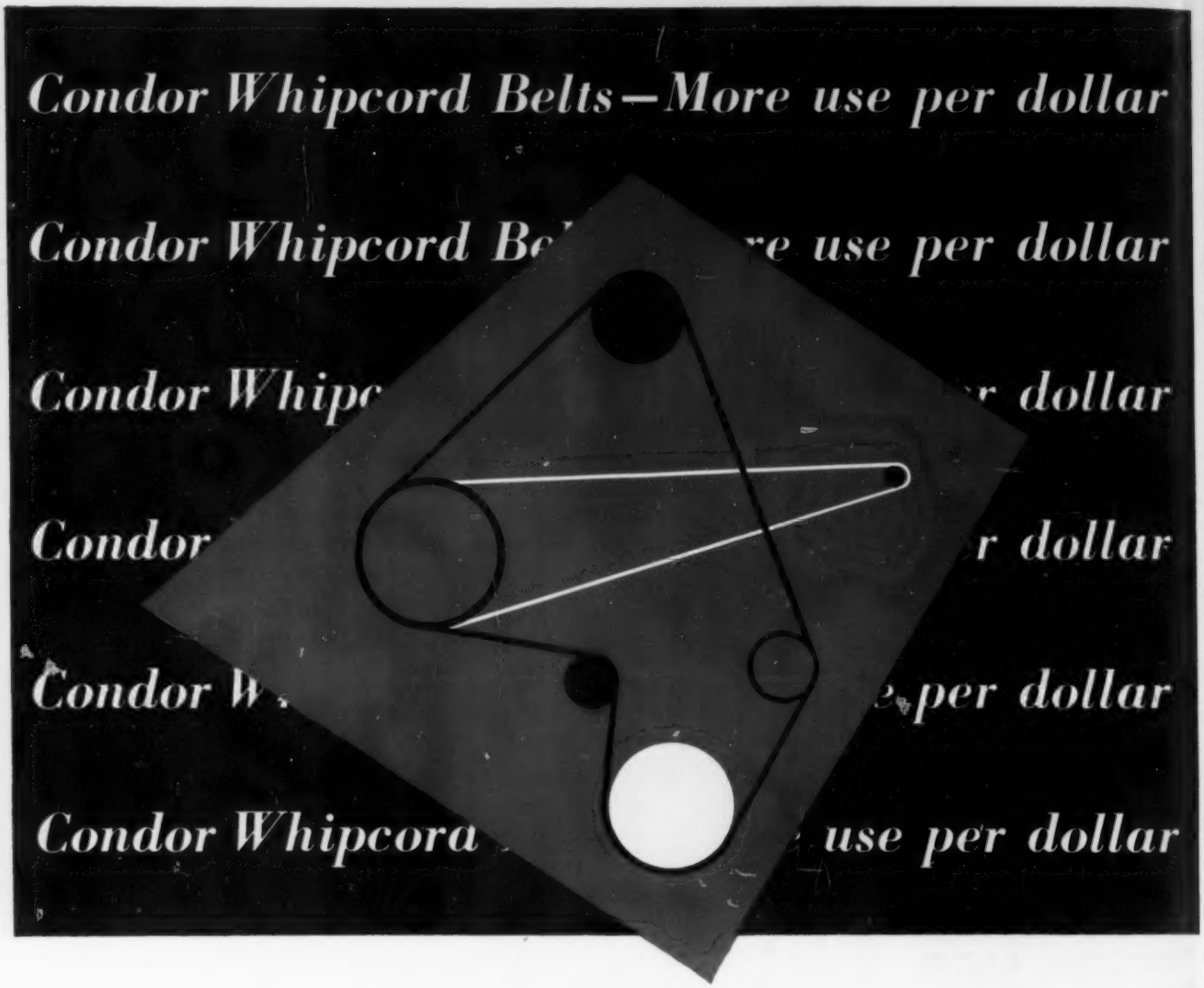
Do you know why customers start and stop buying? Customers will buy if they want what you have; if it will help them do a better and less expensive job. They won't buy unless you make maximum use of salesmen, advertising, promotion and personal calls.

The buyer is on the march. Are you ready? Do you honestly believe you are doing your best as far as products, techniques, customer relations, applications and prices are concerned?

This is inventory year for business—checking on performance in your plant, at the customer's plant, in your sales setup and in yourself. If 1953's challenge is not met head on we will certainly have deflation, unemployment and "readjustment"—and a resurgence of dependence upon government.

Tom Campbell

Editor

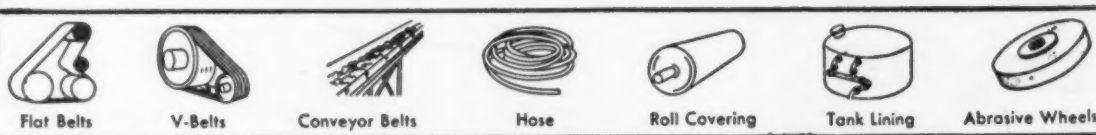


ENDLESS BELTS BUILT TO TAKE THE TURNS . . . Designed for "Belt-killer" drives, Condor Whipcord Belts save you money on all endless belt drives. They are specially engineered for short centers, small pulleys, reverse bends, high speed, high tension. They are practically unaffected by variations in atmosphere—no shrinkage—no stretch on the drive. This saves you downtime for belt take-up. The R/M Extensible-Tip cover-end splice eliminates cover separation. You get MORE USE PER DOLLAR. Ask the R/M distributor for Bulletin 6869. He can help you get MORE USE PER DOLLAR too with R/M hose, conveyor and V-belts.

RM

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

Dear Editor:

Letters from readers

Go Slow

Sir:

I'm just one of the many thousands of readers who admire your editorials. The quality varies only to the extent of the magnitude of the problem under discussion.

It has always seemed to be most regrettable that papers of this description could not have wider distribution, perhaps even to the extent of being used in connection with educational courses in our public schools and colleges, for the reason that they deal with problems of the times and with changes which take place so rapidly that textbooks just cannot keep up with them.

Yours in the Dec. 4 issue entitled "Go Slow on the Downside" was no exception to your usual quality, but it did inspire me to make a suggestion—perhaps at some time in the future you would like to develop an editorial explaining the difference between the reduction of prices due to increased production and the depression of prices below profit return levels in an effort to dispose of excess inventory caused not necessarily by any reduction in the desire to possess, referred to in short as demand, but by mass decline in buying.

As a citizen and taxpayer, I appreciate your efforts to make the widest possible distribution of your wisdom and I certainly hope that both you and many others acting in similar capacity keep up the good work.

F. A. KNAPP

Glenshaw, Pa.

Temperature Controller

Sir:

An item on the Newsfront page of your Dec. 11 issue refers to a newly developed temperature controller using a resistance thermometer having a range of 200° to 1500°C.

Has this equipment been released for sale and can you furnish us with the name of the manufacturer.

Congratulations to your sleuths, who certainly can ferret new developments so far in advance of others for the Newsfront Forecast.

W. L. BESSELMAN
Leeds & Northrup Co.
Philadelphia

Further information about the new temperature controller may be obtained by contacting the U. S. Atomic Energy Commission, Technical Information Service, Oak Ridge, Tenn.—Ed.

Honing ID

Sir:

I read with interest the article in your Dec. 11 issue entitled "Honing Used For Greater, Faster Stock Removal."

You may be interested in learning that at this plant we have been removing .060 in. to .090 in. of stock in tubes ranging in lengths from 6 ft to 10 ft with bores from 1½ in. to 2½ in. in diameter. The material which we remove has a hardness of 55 to 60 Rockwell C.

We start with the bore in a rough "as cast" condition with considerable taper (up to .030 in. in the overall length) and end with a finished bore which must be straight and round with a .001 in tolerance with a finish of 20 to 30 microinches. The operation is performed on a Barnes horizontal hydraulic honing machine.

R. R. McCLINTIC
Works Chief Industrial Engineer
Oil Well Supply Div.
U. S. Steel Co.
Oil City, Pa.

Automation

Sir:

In your article "Automated Forging Line Boosts Output, Cuts Costs," appearing in the Oct. 2 issue, you state on p. 96 that, "Considerable experimental work has been done on press forging dies, including the use of heat-resisting alloy compositions such as 5 pct Cr steels that would not be suitable for hammer forging."

Can you give me more information of composition of this alloy steel for Maxipres dies? Per cent of carbon and alloying elements added to steel?

A. SCHOELLER

Etablissements E. Dervaux
Paris, France

A typical analysis of the type of steel used for press forging dies is: 0.33 pct C; 5.0 pct Cr; 1.70 pct Mo; 0.30 pct Mn; and 0.90 pct Si. Where no water is used, 1.40 pct tungsten may be specified.—Ed.

New Stainless

Sir:

In your Dec. 4 issue, p. 95, you list a replacement for type 430 stainless steel. The item states that it is a 16 pct Cr, 16 pct Mn, nitrogen bearing steel.

I would appreciate further information on this material.

J. H. MARSHALL
Metallurgical Engineer

Tuttle & Kift, Inc.
Chicago

Further information may be obtained from: Allegheny Ludlum Steel Corp., Crucible Steel Co. of America or Republic Steel Corp.—Ed.

"We're former Sheet Coil users. After testing Thinsteel, the precision cold rolled strip steel, it was evident that many dollars could be saved. First, we get more finished parts per ton because of Thinsteel's exceptionally close tolerance — providing maximum feet per pound. Next, we are getting much longer die life—that means less 'downtime,' too—because Thinsteel's uniformity of physicals and accuracy to all specifications smoothed our fabricating problem. And the finish keeps us out of 'hot water' in our plating department — gives us the best looking job in our business and that means more profitable business for us. Maybe you had better switch to Thinsteel."

"We switched to Sheet Coil and are making more money. I know it's wide sheet 'production run' material slit to size, but it's just right for our needs. We don't use expensive, intricate dies—our simple blanking operation can take thickness variations in stride, there's no need for close tolerance material. Since our finished product is painted we find the surface finish of Sheet Coil completely satisfactory for this operation—in fact, the surface not being as smooth is good for our painting requirement. So you see, we are getting a best buy for our need with Sheet Coil."

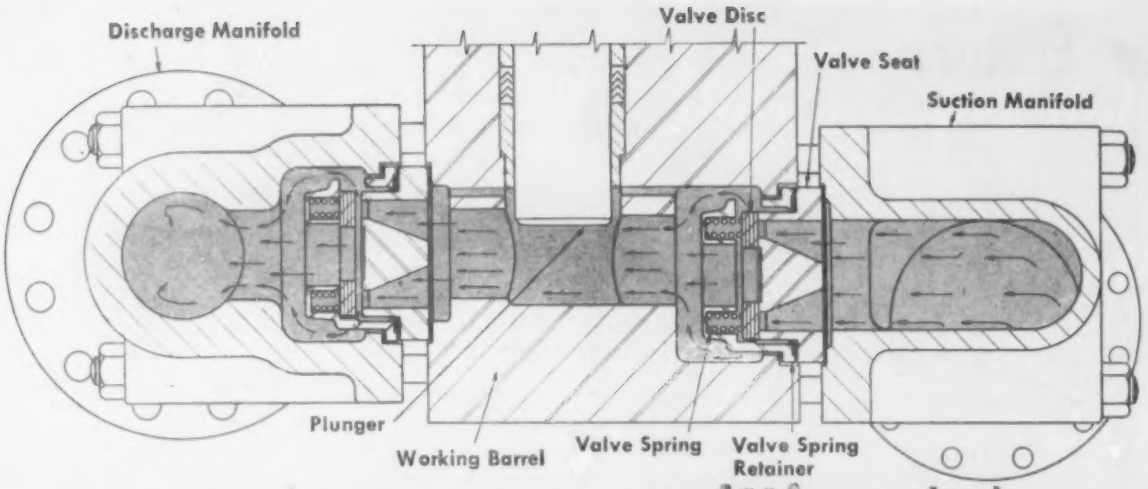
No need for argument as to which strip is better for your job. Kenilworth stocks both—and is ready to help you determine your best buy. Make Kenilworth's big inventory your warehouse—you can depend on Kenilworth's service when you need it.

THE Kenilworth Steel co.

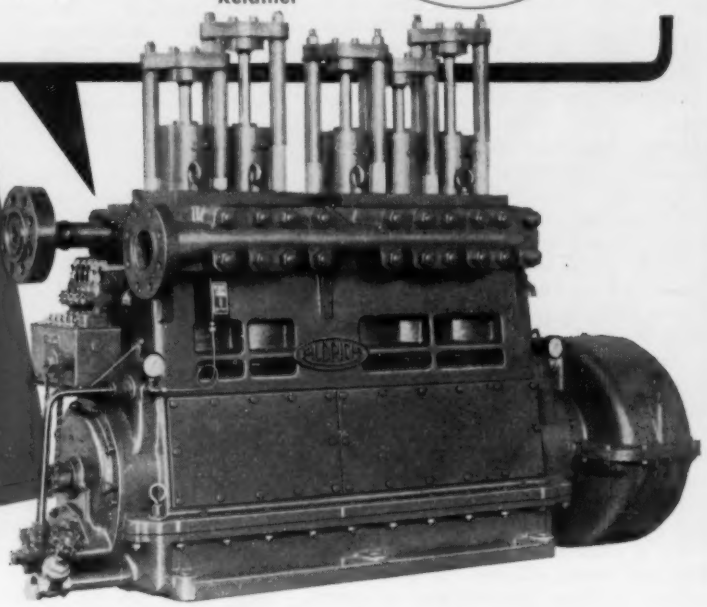
750 BOULEVARD,
KENILWORTH, NEW JERSEY

SPECIALISTS IN FLAT ROLLED METAL PRODUCTS

Telephones: N. Y. COrtlandt 7-2427
N. J. UNionville 2-6900
Teletype: Roselle, N. J., 287



ENGINEERS: Check these points of Aldrich Direct Flow Design



Aldrich engineers eliminated two right-angle turns in the fluid-end. Now, liquid passes from suction to discharge manifold in a *straight line.* That gave the Direct Flow Pump its name, and set up a whole new concept of pumps, pumping, and pump maintenance. It all adds up as follows:

☐ **Increased operating speeds**—you get whatever volume and pressure you need *from a smaller, lighter, more compact pump.*

☐ **Sectionalized construction**—parts can be replaced at a fraction of the cost of a new fluid-end; also, parts can be made of stainless, bronze, Monel or other special materials—extremely important for corrosive fluid service.

☐ **Maintenance made easier**—no more tapered bores in the working barrel. Manifolds are *not* taken off but slide out on studs—affording room to *lift out* valves as complete units. Packing is easily renewed—note accessibility of stuffing boxes.

☐ **Interchangeable wearing parts**—available among 3, 5, 7 and 9 plunger pumps of same stroke size. This minimizes spare parts costs and inventories.

☐ **Changeable plunger sizes**—in many cases it is only necessary to add new plungers, glands, throat bushings and packing *to the same fluid-end.*

☐ **Drive direct**—by connection to synchronous engine type motor or internal combustion engine; also with integral speed reducer or V-belts.

Contact your Aldrich Representative . . . or write to us direct for complete details on 3", 5" or 6" stroke units.

THE ALDRICH PUMP COMPANY

8 PINE STREET • ALLENTOWN, PENNSYLVANIA

...Originators of the Direct Flow Pump

Representatives: P. H. Arden, P. O. Box 185, Glenview, Ill. • Bushnell Controls & Equipment Co., 3929 W. Jefferson Blvd., Los Angeles 16, Calif. • L. T. Gibbs, 509 Petroleum Bldg., Tulsa 3, Okla. • R. B. Moore Supply Co., Inc., Bolivar, N. Y. • Power Specialty Co., 2000 Kipling St., Houston 6, Texas • Reeves & Skinner Machinery Co., 2211 Olive St., St. Louis 3, Mo. Stearns-Roger Manufacturing Co., 1720 California St., Denver 2, Colo. • Export Sales: Petroleum Machinery Corp., 30 Rockefeller Plaza, New York 20, N. Y. • Birmingham • Boston Buffalo • Cincinnati • Cleveland • Detroit • Duluth • Jacksonville • Omaha • Philadelphia • Pittsburgh • Portland, Ore. • Richmond, Va. • San Francisco • Seattle • Spokane, Wash. • Syracuse

Fatigue Cracks

by William M. Coffey

The Annual

This issue as you can see is loaded with important, powerful things so we advise you to skip Fatigue Cracks this week and move on to the meat course. Highly recommended is the REVIEW AND FORECAST of Business, Processes and Materials and "How I Got My Wife Back," by Harry Manville. Particularly useful, too, is the brilliant reference section, METAL INDUSTRY FACTS, first started 3 years ago and now considered indispensable. Note, also, "Setting Up Your First Still," by John Walker. Don't miss either, the listings of TRADE ASSOCIATIONS, which has tremendous popularity—and be sure you read the thrilling "I'm Going to Keep My Baby," by Rita Monroe. If at first you can't find all these titles, keep looking. *Everything* is in here someplace.

Steel Filings

Here begins, poor reader, a new department devoted to stuff like this:

A Medieval knight and his steed might together carry as much as 200 pounds of iron and steel.

***

For each soldier in America's fighting forces in the first year of World War II, the nation produced 24,600 pounds of steel.

***

"Ah wins."
"What yuh got?"
"Three aces."
"No yuh don't. Ah wins."
"What yuh got?"
"Two eights and a razor."
"How cum yuh so lucky?"

***

In the 1860's steel collars were high style for men and women. They were enamelled white and could be cleaned with a damp cloth!

Fermez la fenêtre—*DeGaulle*

From now on we're going to be prepared. So we bought an Astrological Guide for 25¢ and got a complete run-down on what will happen in every day of every week. It's a pretty good thing. Last week, for instance, it told us:

"Home, domestic life and money affairs are fortunately aligned. Contacts with superiors are favored. If you have been wanting to entertain the boss, these are the days. Friendships and group activities bring pleasure and heart-warming contacts."

If you discount the fact that Mr. Gimbel cut off our credit, the wife said nothing all week but "get the washing machine fixed," the boss wearily asked, "how did *you* ever get into the publishing business?" and we were kicked out of the Community Chest for nonpayment of dues, this forecast was amazingly accurate. So good, in fact, that we've sent for the $50 Lifetime Character Analysis. It's as good a hobby as collecting seaweed, old mustard jars or fingernail clippings. What the heck.

Puzzles

Here are some more winners of the license plate puzzler, the aswer being 21, 42, 63 and 84: J. W. (In again) McMurray, Stewart-Warner Corp., Indianapolis, Ind.; H. C. Campbell, Arcos Corp., Phila., Pa.; Art (In again) Tebbe, Gramm Trailer Corp., Delphos, Ohio and Bruce Relyea, Detroit, Mich.

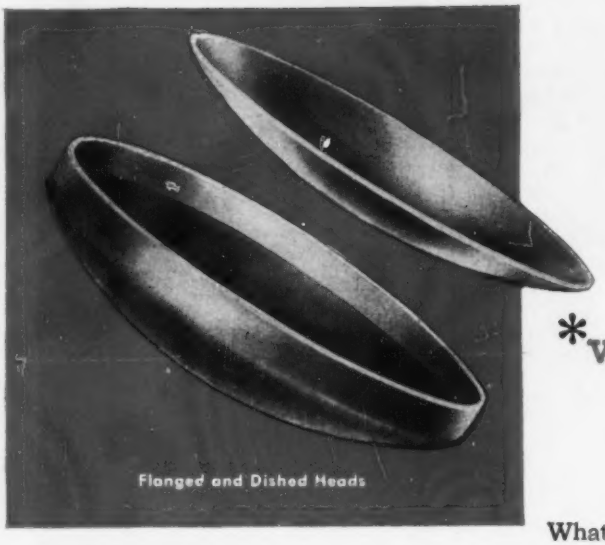
And here are the first winners of the painted sphere puzzler: H. K. Fried, British American & Eastern Co., N. Y. C.; L. H. Badger, Louisville, Ky.; W. (In again) Babcock, Kimble Glass Co., Toledo, Ohio; W. E. McCord, Baltimore, Md. and R. W. Hautzenroeder, Detroit, Mich. The correct answer is: 113.097 sq. inches.

Sorry to announce that C. M. White, Jr., Penn-Harris Steel Company, Harrisburg, Penna., was a little off on this painted sphere problem and A. L. Ciripompa, Wheeling Steel Corp. was only four-tenths away from the correct answer to the now-famous ladder problem. Is it etiquette to announce the losers?

New Puzzle

A traveler had an appointment in a nearby town at 4 p.m. Looking at the map, he found that at 30 miles an hour he could reach his destination at 6 p.m., while at 40 miles per hour he could arrive there at 2 p.m. If he arrived exactly on time, at what average rate per hour did he travel? What was the length of his journey, and how many hours did he travel? Note to Mr. Rice: Thanks for this puzzle. What do you do with your spare time in these cases when you already know the answer?

heads---you win *



Flanged and Dished Heads

*when they're made by CLAYMONT

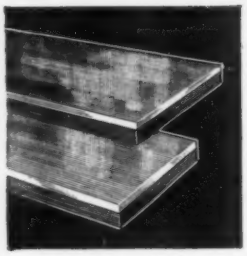
Whatever your needs in flanged and dished heads, you're a winner every time when you call for heads by Claymont.

We can always meet your most exacting specifications because with us the spinning of flanged and dished heads is more than just a job—it's an art into which we put the most painstaking care and specialized know-how.

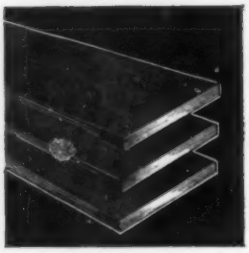
Our flanging department can supply you with flanged and dished heads in diameters from 9 inches to 19 feet and in gauges from 3/16-inch to 6 inches. Made in carbon steel, alloy steel or with stainless steel cladding. We are also prepared to handle head forming operations on both ferrous and non-ferrous metal circles supplied by the customer.

Other Claymont products include Stainless-Clad Steel Plates, Alloy and Carbon Steel Plates, Large Diameter Welded Steel Pipe.

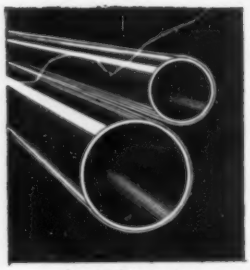
Write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.



Stainless-Clad Steel Plates



Alloy and Carbon Steel Plates



Large Diameter Welded Steel Pipe

THE COLORADO FUEL AND IRON CORPORATION • Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION • Oakland, California
WICKWIRE SPENCER STEEL DIVISION • Atlanta • Boston • Buffalo
Chicago • Detroit • New York • Philadelphia

CLAYMONT STEEL PRODUCTS

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

SHORT-RUN, CAST-TO-SHAPE CAST IRON DIES are an interesting development worth watching. Only finish grinding is required. Die sizes are small, stamping experience is limited but results are promising.

GOOD BUT NOT SENSATIONAL is how automakers size up the 1953 market. They figure the market can absorb about 5¼ million cars, 1.2 million trucks. That's good, but less than 1951 and well under 1950 when 6,672,141 passenger cars alone were built.

THE LAZY MAN'S FRIEND, the automatic clock radio that turns on the morning coffee, accounted for some 1.7 million of the 5.2 million home radio sets sold in 1952. Back in 1951 only 777,155 of the automatics were sold.

PILOT PLANT "RESERVES" IN LIEU OF STOCKPILING is the defense backstop machine tool builders are hoping to establish. They believe a standby segment of operating tools would be more economical, more adaptable to design changes. Cancellations and confusion which followed the Korea outbreak goaded planners to search for a more efficient system.

BIGGEST MAGNETIZING UNIT in a radio manufacturing plant is being installed by one producer. The steel yoke, with coil winding, will weigh 2½ tons. It was designed and built especially to magnetize big 15-in. speakers used in high fidelity circuits.

RUBBER PAD FORMING, using an inflatable rubber bag and a single die, has excellent prospects for future development. At least one automaker is seriously interested. Outstanding advantage of the method: Stampings are wrinkle-free. Present limitation is size.

THIRD HIGHEST IN HISTORY is the record 93.3 million tons produced by United States steelmakers last year. And that despite loss of 19 million tons by strikes. With most expansion programs nearing completion, the industry can turn out as much as 118.8 million tons in 1953--if needed. Capacity will reach 120 million by midyear.

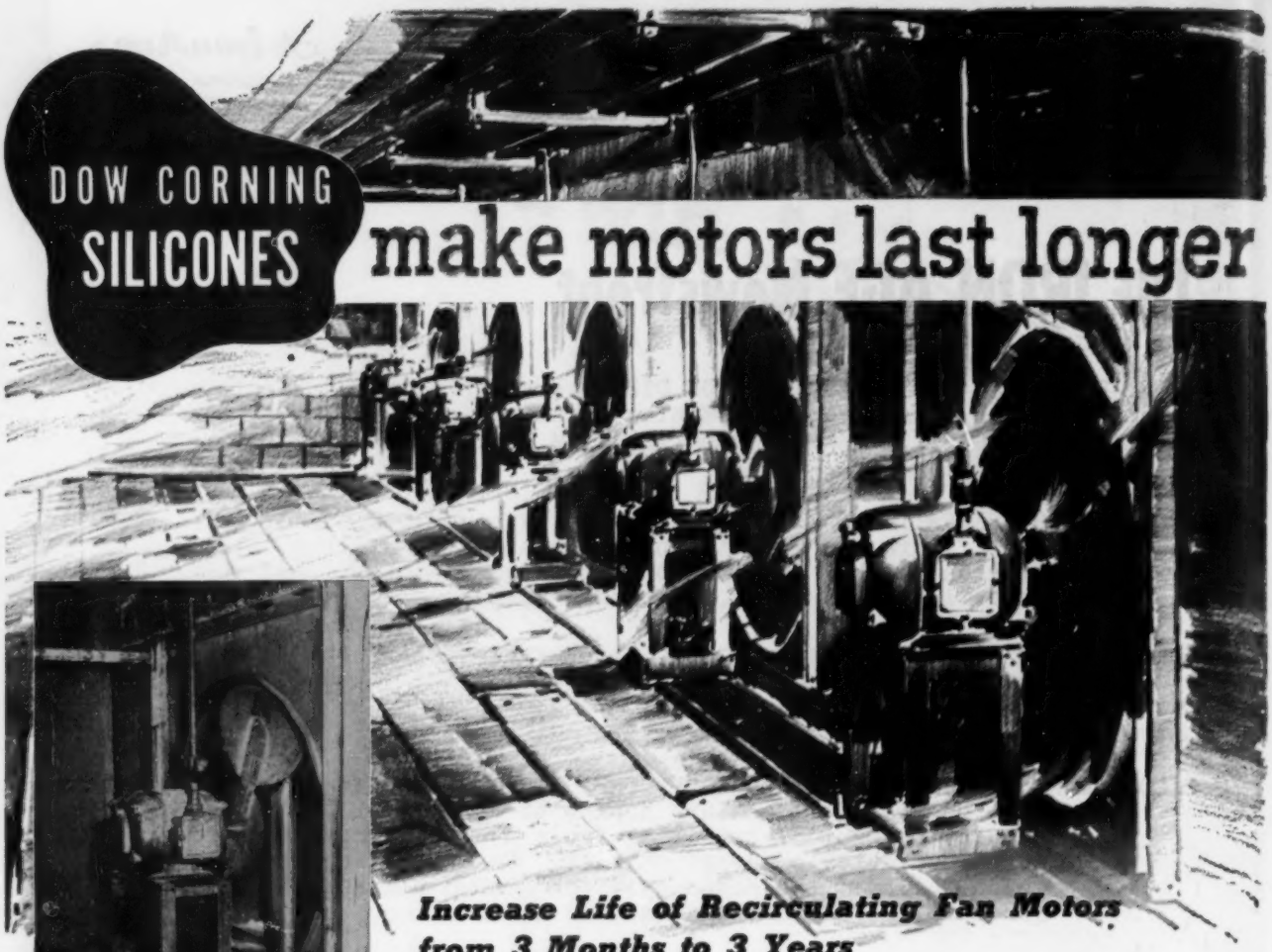
PRICE PATTERNS IN NONFERROUS METALS will be mixed in 1953. Aluminum and copper may get the nod for increases from the Office of Price Stabilization. Lead and zinc will obediently tag London trends. Don't be surprised if tin slides off its $1.21½ perch.

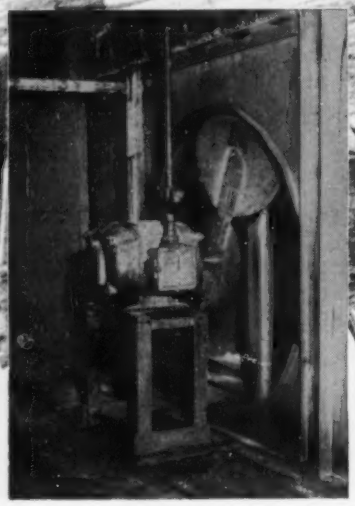
TECHNICAL TRENDS TO WATCH THIS YEAR: More continuous casting of steel and aluminum, more automatic plating, wider use of automatic mechanical handling, automation, vacuum melting of metals.

BIGGEST PROBLEM in use of the new 16 Mn, 16 Cr, 1 pct Ni, nitrogen stainless is commercial rather than engineering. So far the price for the new grade has not been set. Steel has been shipped no charge, "to be billed later." Detroit is getting hot on the grade and demanding that the producers make up their minds.

DOW CORNING SILICONES

make motors last longer





Increase Life of Recirculating Fan Motors from 3 Months to 3 Years

The Wood Development Corporation of Sidnaw, Michigan had a problem. None of the 21 Class A insulated 1½ hp fan motors recirculating air in their drying kiln ever lasted more than three months. Fumes from kiln-dried lumber are hot; moisture content is almost 50%; and they're acid enough to eat the nameplates right off the motors.

Over three years ago one of those motors was rewound with Silicone (Class H) insulation. As the others failed they were also rewound with Class H insulation. None of these motors has burned out. The first of them is still in service after more than 12 times the average life of Class A motors under the same operating conditions.

That's the kind of performance that has persuaded more and more production and maintenance men to specify Silicone (Class H) Insulation for hard working motors. Motors rewound with silicone insulation can deliver half again their nameplate rating; outlast ordinary motors more than 10 to 1. They require no extra fittings, mounts, or wiring for re-installation, and they cost very little more than motors wound with the next best class of insulating materials.

CUT MOTOR BEARING MAINTENANCE with DOW CORNING 44 SILICONE GREASE

Proved by performance in the permanently sealed bearings of thousands of motors prelubricated for a good five years by a leading motor manufacturer, Dow Corning 44 Silicone Grease saves downtime; pays for itself in reduced relubrication costs.

mail this coupon Today

DOW CORNING CORP., Dept. O-1
Midland, Michigan
Please send me:
- ☐ Catalog of Class H Insulating Materials.
- ☐ List of Class H motor repair shops.
- ☐ Data on Silicone Grease for motor bearings.
- ☐ 32-page booklet entitled "What's A Silicone?"

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

DOW CORNING CORPORATION
MIDLAND MICHIGAN

DOW CORNING SILICONES

Atlanta • Chicago • Cleveland • Dallas • New York • Los Angeles • Washington, D.C
In Canada: Fiberglas Canada Ltd., Toronto • In England: Midland Silicones Ltd., London

1953: What Industry Leaders Expect

Coming year will be a good one, top industry executives tell The Iron Age . . . Keener competition expected . . . Level of defense spending an important variable . . . Abundant steel.

Clarence B. Randall, president, Inland Steel Co.: "I doubt that we will reach that long expected balance between supply and demand for steel before midyear. . . . We should be spared a strike in 1953 . . . steel (will be) in quantities such as users never had before. . . ."

Gwilym A. Price, president, Westinghouse Electric Corp.: "Outlook for business generally in 1953 appears to be good. Our order backlogs are large."

Frank Purnell, chairman, Youngstown Sheet & Tube Co.: "I look for reasonably good business and employment in the steel industry through 1953. First half of the year will be especially strong."

L. L. Colbert, president, Chrysler Corp.: "America's outstanding industrial performance in 1952 gives us reason to be hopeful that high volume production with high employment can be continued."

Cyril J. Bath, president, Cyril Bath Co.: "I expect business to be a little slower in 1953 but don't believe there will be any sharp recession . . . decreasing raw materials prices indicate a healthy production trend."

Charles M. White, president, Republic Steel Corp.: "I am not at all pessimistic about the long range picture. . . . By sound fiscal policies and decreased taxation, inflation will be halted. . . ."

John C. Sharp, president, Hotpoint Co.: "Hotpoint expects to increase its business 25 pct in 1953 . . . 1953 will be a good year, but the most competitive in the appliance industry since the end of World War II."

C. L. Hardy, president, Joseph T. Ryerson & Sons, Inc.: "We anticipate a good volume of business the first six months of 1953 . . . steel will not be in even supply until after the second quarter of 1953 . . . warehouse distributors will maintain a good volume of business during this period . . . pent-up needs of the consumer durable goods industries will take up some of the defense slack."

John L. McCaffrey, president, International Harvester Co.: ". . . prices will remain steady within our industry during 1953, regardless of whether price controls are withdrawn or not."

Swan Bergstrom, president, National Machine Tool Builders'

Turn to Page 228

Review
Forecast

Don't Miss These Latest Developments — and Tips on Things to Come

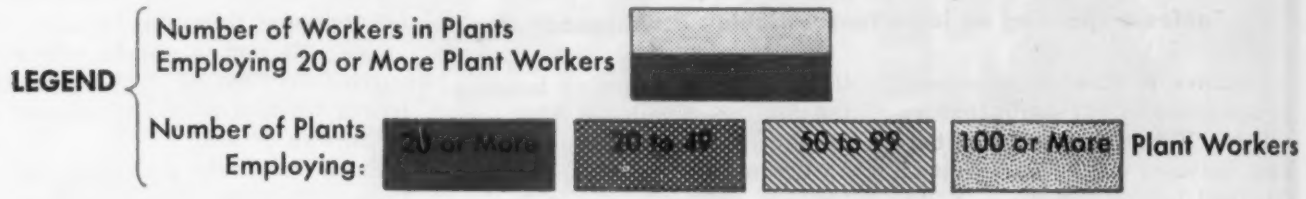
METALWORKING OUTLOOK:

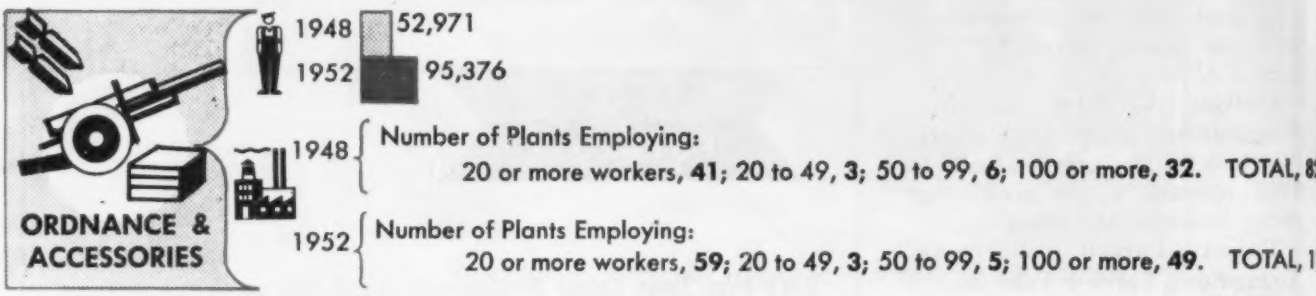
Sales will be higher than ever ..... p. 274
Competition will emphasize civilian business ..... p. 275
Controls will fade as materials ease ..... p. 276
Ore deficit overcome; taconite on the way ..... p. 278
Coal industry tooling for comeback ..... p. 279
Scrap drought turns to plenty ..... p. 280
Synthetic refractories gain popularity ..... p. 281
Alloys gain importance; need conservation ..... p. 282
Metal finishing research pays off ..... p. 286
Materials handling planning cuts costs ..... p. 289
Machining production moves faster ..... p. 290
Future heat treating will be mechanized ..... p. 293
Automation needs fewer people, more skill ..... p. 294
Extended vacuum melting includes steel ..... p. 297
Founders adopt shell molding ..... p. 298
Stampers mechanize their plants ..... p. 300
New forging presses permit better design ..... p. 301
Extrusion saves material, time, money ..... p. 302
Welding in inert atmosphere mushrooms ..... p. 303
Small shops adopt quality control ..... p. 304
Ultrasonic testing goes on TV ..... p. 305

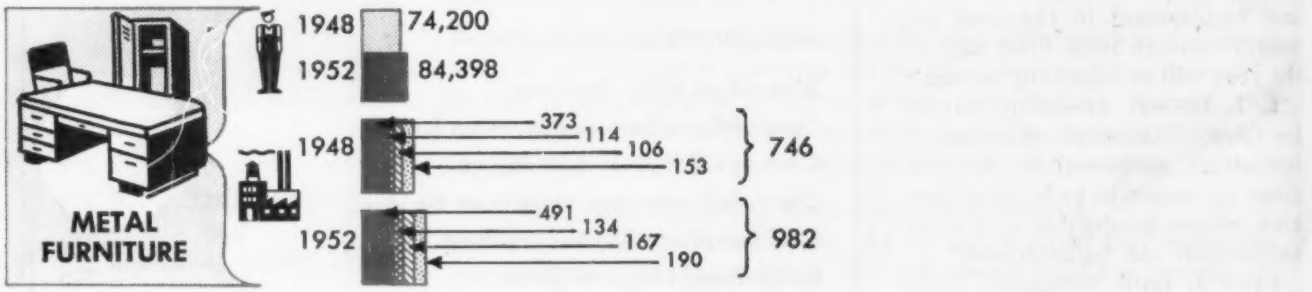
Metalworking's Muscles Get Stronger

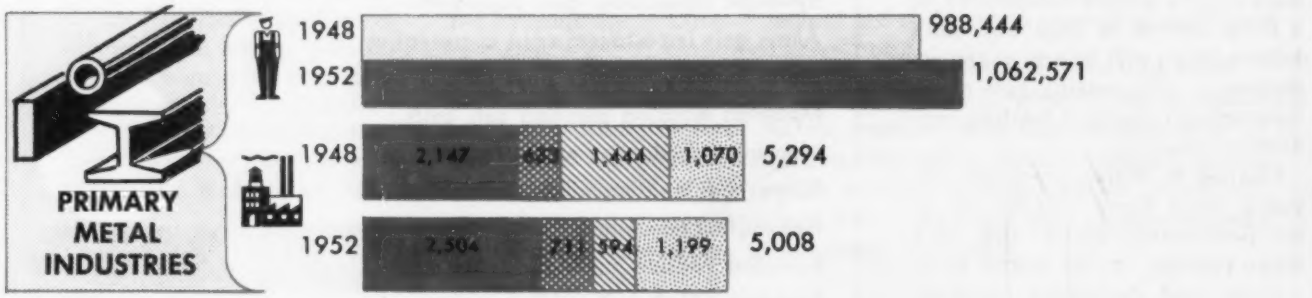
Pressures of a guns and butter economy has brought almost 1 million more productive workers into the metalworking industry and created about 7000 new plants. A special survey by THE IRON AGE's Research Div. shows this growth from 1948 to 1952. Results of the survey are tabulated graphically below.

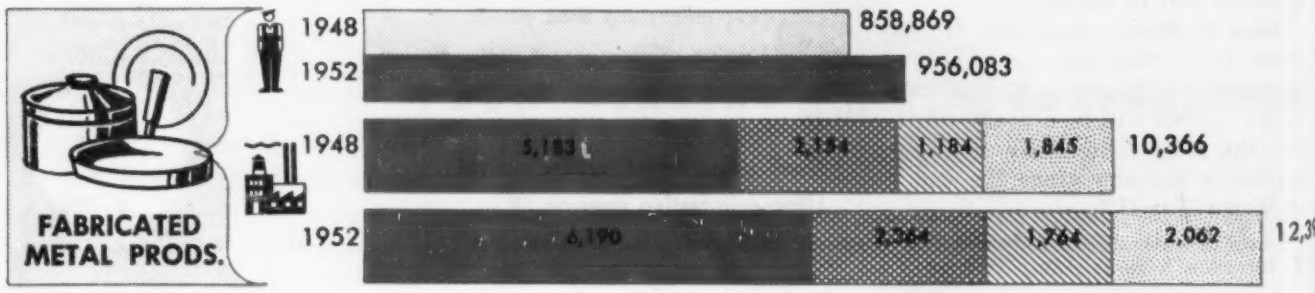
Workers are production workers only. Clerical, sales and management personnel are not shown. Only plants with 20 or more production workers are covered. Breakdown by industry groups is in accordance with U. S. Census Bureau Standard Industrial Code. A detailed breakdown is available from THE IRON AGE.

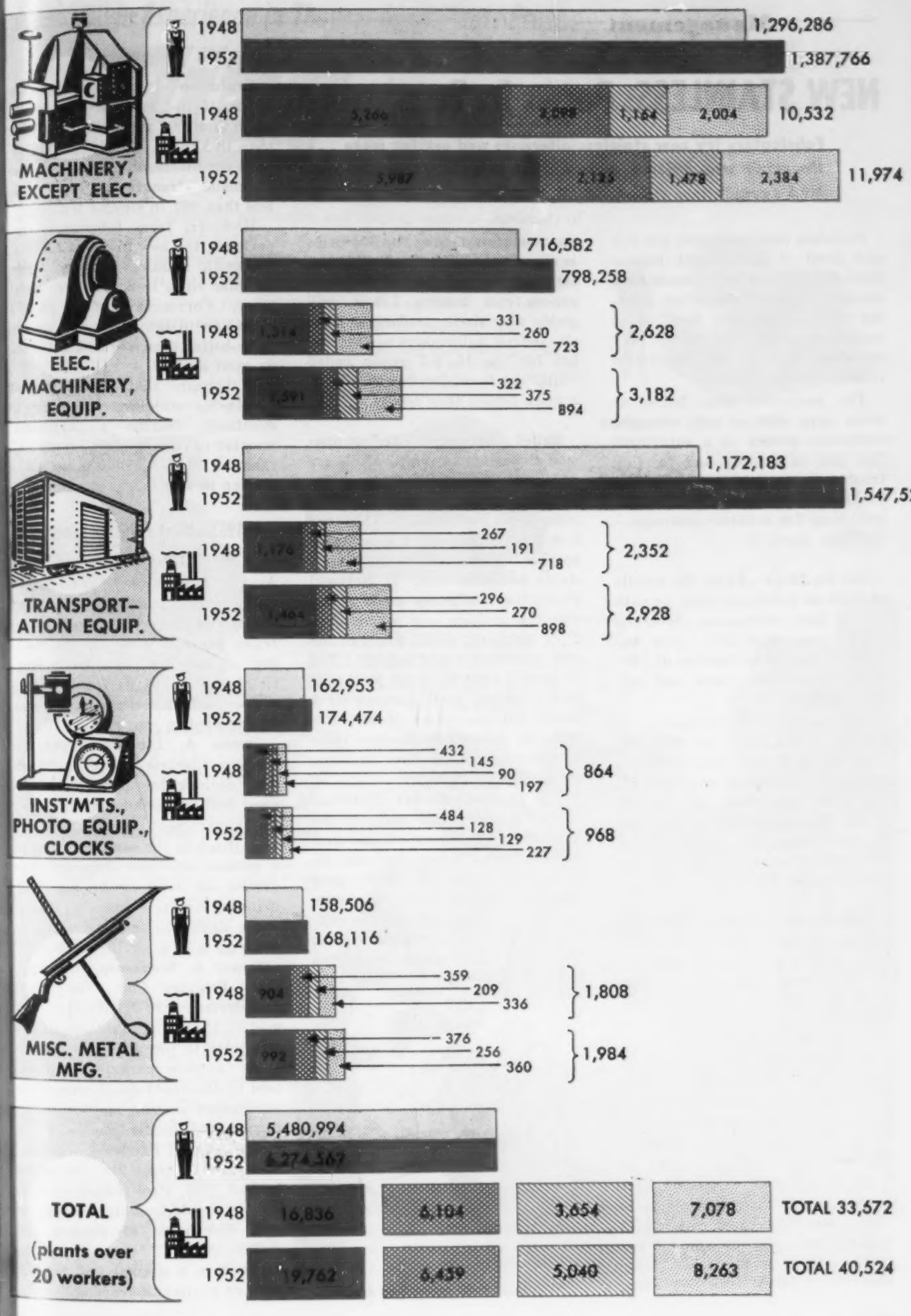



ORDNANCE & ACCESSORIES
1948 52,971
1952 95,376
1948 Number of Plants Employing:
20 or more workers, 41; 20 to 49, 3; 50 to 99, 6; 100 or more, 32. TOTAL, 82
1952 Number of Plants Employing:
20 or more workers, 59; 20 to 49, 3; 50 to 99, 5; 100 or more, 49. TOTAL, 11








MACHINERY, EXCEPT ELEC.
1948
1952
1,296,286
1,387,766
1948
1952
5,266
2,004
1,164
10,532
5,987
2,384
1,478
11,974
ELEC. MACHINERY, EQUIP.
1948
1952
716,582
798,258
1948
1,314
331
260
723
2,628
1952
1,591
322
375
894
3,182
TRANSPORT-ATION EQUIP.
1948
1952
1,172,183
1,547,520
1948
1,176
267
191
718
2,352
1952
1,404
296
270
898
2,928
INST'M'TS., PHOTO EQUIP., CLOCKS
1948
1952
162,953
174,474
1948
432
145
90
197
864
1952
484
128
129
227
968
MISC. METAL MFG.
1948
1952
158,506
168,116
1948
904
359
209
336
1,808
1952
992
376
256
360
1,984
TOTAL
(plants over 20 workers)
1948
1952
5,480,994
6,274,367
1948
16,836
6,104
3,654
7,078
TOTAL 33,672
1952
19,762
6,439
5,040
8,263
TOTAL 40,524

NEW STAINLESS: Passes Its Tests

Fabricators try new stainless alternate and ask for more . . . Uncertain over pricing, mills will bill later . . . Industry finds NPA's regulations stifling—*By D. I. Brown.*

Stainless steel producers are sick and tired of government regulations which twice in a decade have severely curtailed their fast growing stainless markets. M-80, which restricted commercial use of any stainless over 1 pct maximum nickel, was the last straw.

The producers were forced to make type 430 or 442 straight chromium grades as a substitute. But due to welding and forming troubles in the field and production problems in the mills, they started searching for a better alternate—and they found it.

Ask for More—About the middle of 1952 the producers came up with an old high manganese chromium grade (see page 282) that has many of the characteristics of 18-8. A few heats were made and supplied to Budd Co.

The new grade (containing 16 pct Cr, 16 pct Mn, 1 pct Max. Ni, 0.15 N_2, and 0.10 Max. C) is a much better welding and fabricating steel than either 430 or 442. It can be processed about the same as either types 301 or 304. It has a silvery luster, not bluish like 430 nor yellowish like 302.

Disadvantages—Like most good things, 16-16-1 has some drawbacks. Mill yields have been extremely poor, particularly from ingot to slab. Shortages of electrolytic manganese (needed to keep the carbon under 0.10 maximum) have hurt two mills. However, two other mills have a sufficient supply of this manganese to meet good delivery schedules. The third drawback is a commercial one—price.

So far, all mill shipments have been at no charge; "billing to be made later" because the mills haven't been able to arrive at a price. The users would like to see the base price of type 301 used; the producers believe the 304 price is closer to reality. High-nitrogen-ferrochrome and electrolytic manganese cost money. Lower mill yields also shove production costs up. Detroit automakers are getting hot for the 16-16-1 grade, called "TRC" by Budd Co., but they want a price *before* they buy it.

Relief Needed—The manganese-chromium austenitic steels are widely used in Germany, except the Germans don't have to struggle with M-80 limitations. They use 2 or 4 pct nickel with a lower manganese which makes the grade stable austenite-wise. If National Production Authority would recognize the problem and permit even 2 pct maximum nickel, many of the mill problems would vanish. The 17 pct Cr, 4 pct Ni, 6 pct Mn grade died a natural death because NPA would not reconsider M-80. But mills are determined to serve their customers—even if they have to struggle with 16-16-1.

The paradox is that 17-4-6 or 16-16-1 would do for many of the military applications which now call for 18-8. In the long run, we may save nickel if M-80 were changed to 2 or 4 pct maximum nickel—if at the same time the military would take a critical look at their own specifications and stop their overgrading.

"We've got more brains than dough."

Evolution—In the annealed condition, 16-16-1 has a yield strength of 40 to 45,000 psi, which is higher than 18-8 types. In ¼, ½ and full-hard conditions, the new grade has a tensile strength of 10,000 psi, less than 301 in similar tempers.

However, from fabricators' experience, the new grade is the best austenitic stainless to come down the pike since 18-8, and they want more. Corrosion data on 16-16-1 is meager to date. But it is known to be better than 430 and not quite as good as 18-8.

It appears that some type of Cr-Mn-N_2 stainless is going to eventually become a permanent member of our stainless family and that the 16-16-1 grade is merely a starter in this long term trend.

1953—What Industry Expects

Continued from Page 225

Assn.: "The course of industry in 1953 hinges primarily upon the status and timetable of various defense projects now in the making . . . unless there is some drastic change in the national defense picture, substantial production may be expected to continue."

James A. Lincoln, president, Lincoln Electric Co.: "The business outlook for 1953 depends a good deal on the amount of money the government spends. We are very much in the same position as a person who has three or four drinks. As long as he keeps on drinking he feels fine . . . one of these days . . . we are going to wake up with a terrific hangover."

Henry J. Trenkamp, president, Ohio Foundry Co.: "Gray iron foundrymen are generally optimistic that business conditions will remain on an even keel in 1953 . . . new markets are promised by the rapid development and acceptance of the shell molding process and ductile iron."

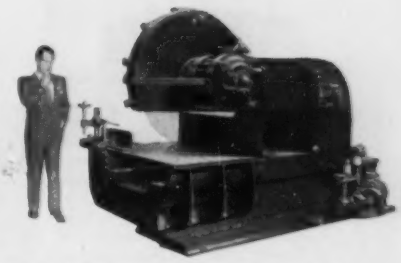
Benjamin F. Fairless, chairman, U. S. Steel Corp.: "In the second half of 1953, steel industry capacity . . . should be fully adequate to meet the needs of defense and civilian users . . . we shall then be engaged in a normal and healthy state of competitive selling."

World-Wide Experience in Thousands of Plants Proves

Kling is a profitable investment in SPEED!

Kling Machines are speeding production and cutting costs for thousands of manufacturers all over the world. Let us show you how Kling Machines can help you produce faster, easier, better, at lower cost. Benefit by Kling's engineering experience of over a half-century; consult us, without cost. **Send for Bulletins** on the machines in which you are interested—**Kling Bros. Engineering Works • 1322 North Kostner Avenue • Chicago 51, Illinois, U. S. A.**

Manufacturers of Plate Bending Rolls . . . Punches . . . Combination Shear, Punch & Copers . . . Double Angle Shears . . . Rotary Shears . . . Bulldozers . . . Bar Benders . . . Beam Benders . . . Combined Punch & Beam Benders . . . Punches—Horizontal, Vertical & Beam Types . . . Angle Bending Rolls . . . Guillotine Type Bar Shears.

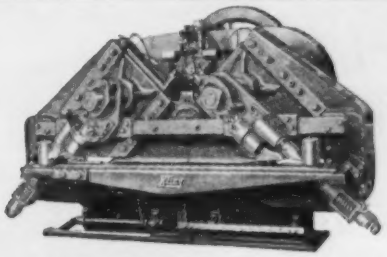


KLING HIGH SPEED FRICTION SAWS

. . . enable you to do the job faster

Cut time required for cutting beams, channels, rails, angles, squares, rounds or tubes. No set-up changes needed to cut any sequence of structural shapes. Takes place of several separate shears or slow speed saws. Cut alloy steels, too, in record time.

Send for free Bulletin No. 9200



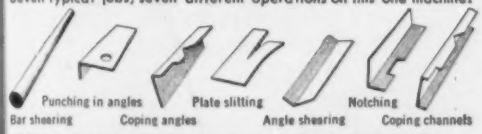
KLING DOUBLE ANGLE SHEARS

. . . 2 Shears in 1 machine

This high-production machine can give you more and cleaner cuts on many different shearing operations. For instance you can simultaneously shear round bars and bar angles on left side and structural angles and flat bars on the right. Automatic hold-downs as well as automatic lubrication are available.

Send for free Bulletin No. 2345

Seven typical jobs; seven different operations on this one machine:

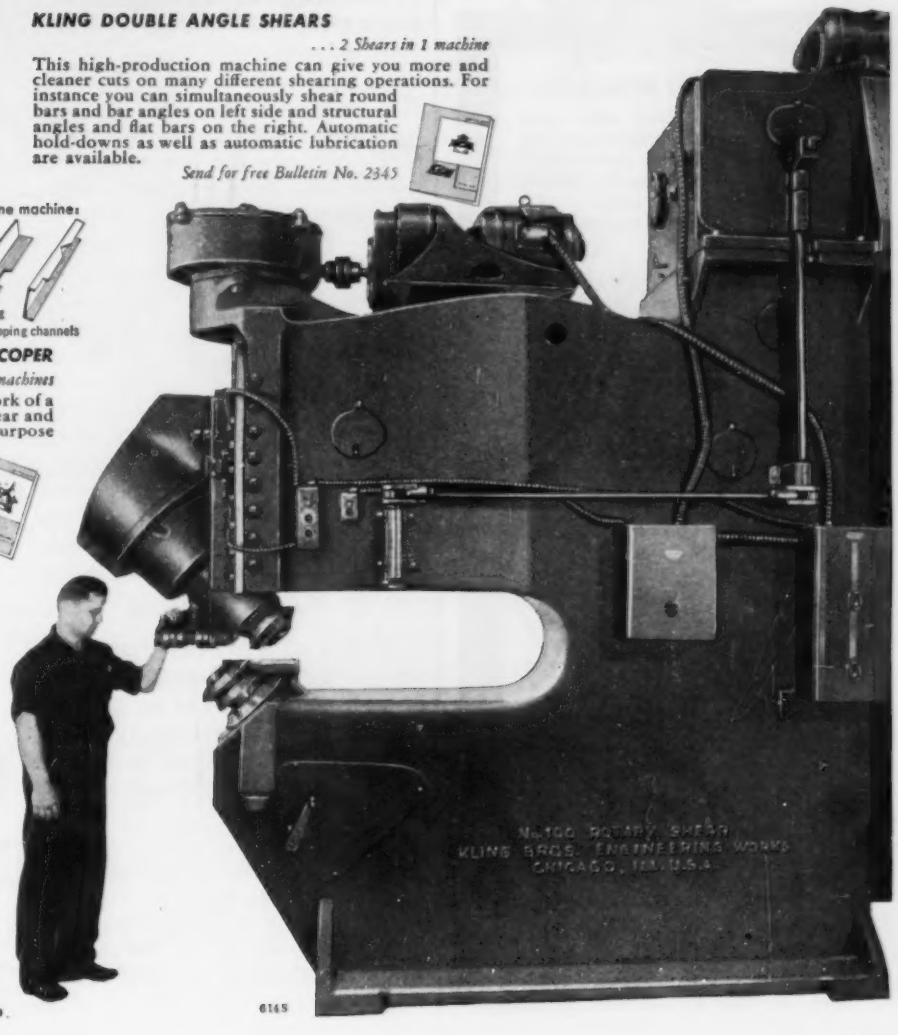


KLING COMBINATION SHEAR, PUNCH AND COPER

. . . does the work of many machines

One of these Kling Machines can turn out the work of a separate punch, angle shear, bar shear, plate shear and notcher—yet it costs little more than a single-purpose punch. For speed and safety, each end operates independently. Foot pedals allow both operators to keep hands free to hold work. Available for light, medium or heavy work.

Send for free Bulletin No. 347



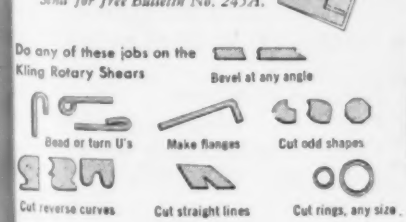
KLING ROTARY SHEARS

. . . save time . . . improve accuracy . . . cut costs

Get hair-line precision as well as speed, in sheet and plate cutting, whether you do one or many of the operations shown. One Kling Shear will often eliminate the need of several old-style shears or other equipment. Many attachments available. A wide range of types and sizes to meet your specific requirements, up to a rated capacity to shear 1" thick mild steel.

Send for free Bulletin No. 245A.

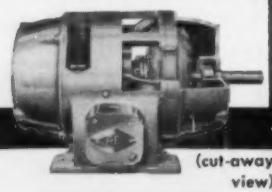
Do any of these jobs on the Kling Rotary Shears



6145

DO THESE NEW
Reuland motors

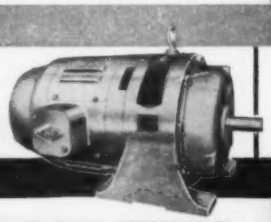
FIT INTO YOUR PICTURE?



(cut-away view)

FLUID-SHAFT MOTOR

Provides smooth acceleration of heavy loads. More compact than separate motor and fluid coupling. *Perfect alignment!* Thousands in use on cranes, mixers, centrifugals, etc.



FLUID-SHAFT MOTOREDUCER

This Fluid-Shaft motor and gear reducer combination converts the motor's conventional high speed into a slow speed, smooth starting, compact unit. Ideal for car pullers, conveyors, dryers, etc.

MAGNETIC BRAKE

The only brake that permits the use of TWO output shafts per motor. *When desired, the motor shaft can be extended right through!* Only 6 major parts...no levers or linkage... self adjusting . . . half usual length!

Write for new engineering folder on these and other *exclusive* Reuland Products... *industrial units designed to fill the needs of the nation's leading equipment manufacturers!*

RE **REULAND**
ELECTRIC COMPANY

Alhambra, Calif. Representatives in all principal cities
FIRST IN QUALITY . . . FIRST IN DESIGN

Industrial Briefs

Merger Approved — The proposed merger of Blaw-Knox Co. and its three domestic operating subsidiaries, The Foote Co., Inc., Buflovak Midwest Co., and Blaw-Knox Construction Co., has been approved. The surviving corporation will bear the name BLAW-KNOX CO., Pittsburgh.

Presses Installed — Quaker Rubber Corp., division of H. K. PORTER CO., INC. Philadelphia, has installed two new, large conveyer belt presses, one 72-in. and one 60-in. These installations mark the completion of the $250,000 Belt Dept. expansion.

New Department—PENNSYLVANIA SALT MFG. CO., Philadelphia, has organized a Sales Research Dept. to handle all statistical and analytical functions pertaining to marketing. E. M. Ott will be manager of the new department.

Elected — Lee Sekulski, sales manager MATHEWS CONVEYER CO., Ellwood City, Pa., has been elected a director of the Conveyor Equipt. Manufacturers Assn.

Will Build — BATH IRON WORKS, Bath, Me., will build three large, new-type destroyers and two escort vessels to meet Navy contracts totaling more than $58 million.

50th Anniversary—SHEPARD NILES CRANE & HOIST CORP., Montour Falls, New York, will observe its 50th Anniversary during 1953.

International Conference — The UNITED STATES COUNCIL of the INTERNATIONAL CHAMBER OF COMMERCE, New York, has scheduled an international business economic conference to be held in Vienna, Austria, from May 18 through May 23, 1953.

Research Center—INTERNATIONAL BUSINESS MACHINES CORP. plans to begin construction of its Research Center at its Poughkeepsie, N. Y., plant early next spring. The contract has been awarded to Turner Construction Co., N. Y.

Dividend Declared—A quarterly dividend of 15¢ per share on the company's $13 par value common stock has been declared by BALDWIN-LIMA-HAMILTON CORP., Philadelphia.

Re-Elected — Henry Fiestal, Paterson Steel Baling Co., Paterson, N. J., has been re-elected president of the New Jersey Chapter of the INSTITUTE OF SCRAP IRON & STEEL INC.

New Plant — A new quarter-million dollar Configured Tube Products Company plant was formally opened recently in Bellwood, Ill. The plant was designed by ENGINEERING SYSTEMS, INC., Chicago.

Canadian Defense Orders — In the 2 weeks ending Nov. 30, Canadian defense orders placed totalled $12,292,422, and included a contract to INTERNATIONAL HARVESTER CO. of Canada Ltd. for trucks, tractors and automotive spares.

Construction High — F. W. DODGE CORP., New York, reports that contract awards for the month of November for the 37 eastern states brought the year's total for 11 months to 5 pct over the 11-month figure for last year. The 11 month 1952 figure is $15,307,552,000. Last year's 12-month figure was $15,751,131,000.

Elected — William T. Nichols, director, General Engineering Dept., Monsanto Chemical Co., St. Louis, has been elected president of the AMERICAN INSTITUTE OF CHEMICAL ENGINEERS for 1953.

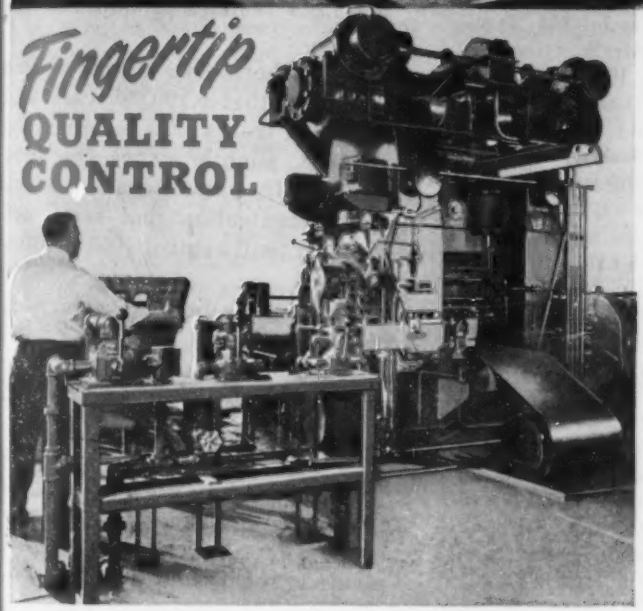
Welding Electrode Plant—WESTINGHOUSE ELECTRIC CORP. plans to build a plant for the manufacture of welding electrodes and brazing alloys on a 52-acre site near Montevallo, Ala.

Stock Offer—COLORADO FUEL & IRON CORP. will offer for public sales 340,000 shares of no-par common stock to help finance the purchases of additional facilities according to information filed with the Securities & Exchange Commission.

Plan to Move—CALUMET & HECLA INC. plans to move its executive offices to Chicago from Boston early this year. The move is designed to locate the firm's headquarters at the geographical center of its operations.

National Distributor — The Welding Dept. of GENERAL ELECTRIC CORP., Schenectady, is now a national distributor of DryRod Electrode Ovens.

Complete Steel Service* from One Source



This completely modern plant with latest type equipment for *rolling* strip and processing sheet and strip steel is your ideal source for:

* Warehouse stocks in sheets, plates, coils, cut lengths . . . All tempers and finishes.
* Steel strip in coils and cut lengths . . . restricted tolerances, all tempers and finishes.
* Roller leveling, pickling, annealing, shearing, slitting and skin rolling.

PRODUCTION STEEL STRIP CORPORATION supplements our regular warehouse service with custom steel at mill prices. This new, 4-high, reversing type cold strip mill with its modern, electronically operated *fingertip* quality control affords unusual flexibility in supplying steel strip to your exact specifications. Thickness .025 to .125 in all tempers and either bright or satin finish, can be processed to your exact width in coil or cut lengths.

PRODUCTION STEEL

WAREHOUSES:

PRODUCTION STEEL COMPANY
20001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

PRODUCTION STEEL STRIP CORP.
20001 Sherwood Ave., Detroit 34, Mich.
Phone TWinbrook 3-5000

PRODUCTION STEEL COIL, INC.
20001 Sherwood Ave., Detroit 34, Mich.
Phone TWinbrook 3-5000

PRODUCTION STEEL CO. OF ILLINOIS
2801 Roosevelt Rd., Broadview, Ill. (Chicago)
Phone: MAnsfield 6-4242

SENECA STEEL SERVICE, INC.
1050 Military Rd., Buffalo 17, N. Y.
Phone: Riverside 7920

SALES OFFICES:

PRODUCTION STEEL COMPANY
1002 E. 81st Street, Indianapolis, Ind.
Phone: Broadway 3468
E. W. Richardson, Sales Representative

PRODUCTION STEEL COMPANY
548 W. Mechanic Street, Jackson, Mich.
Phone: 2-9097
Glenn Christman, Sales Representative

PRODUCTION STEEL CO. OF ILLINOIS
5226 N. Bay Ridge Ave., Milwaukee, Wisc.
Phone: WOodruff 2-1206
H. Clive Morrison, Sales Representative

SENECA STEEL SERVICE, INC.
739 Westchester Ave., Rochester, N. Y.
Phone: Culver 7480
W. J. Knoll, Sales Representative

SENECA STEEL SERVICE, INC.
1347 Northcliffe Rd., Syracuse, N. Y.
Phone: 73-5722
Dean Hethington, Sales Representative

SENECA STEEL SERVICE, INC.
347 Price Street, Jamestown, N. Y.
Phone: 5759
S. N. Olmsted, Jr., Sales Representative

PRODUCTION STEEL COMPANY
1040 High View Lane, Green Bay, Wisc.
Phone: Howard 7407
Tony Canadeo, Sales Representative

Review
Forecast

Selling Will Get Added Emphasis

Newer features must now pass the test of productive competition . . . Cost cutting accented . . . Automation, plastic dies and shell molding bear watching—By *R. D. Raddant.*

New ideas and innovations that made the automobile new in 1952 will be confronted by the test of productive competition in 1953. Whatever looked good in trial runs will have to stand up to the demands of high production in speed and endurance as well as in terms of cost.

The knock-down, drag-out fight that is forecast for 1953 will tolerate few luxuries that don't pay their way. At the same time, it will encourage the use of new ideas that can cut time, shave costs, conserve space and improve quality.

The pressure on cost is increased by the fact that most materials are up in price, principally due to the steel and coal increases, at the same time when the biggest style and engineering revisions in years are being made.

Handling Progress — Probably the most overworked word in 1952 was "automation" the now established term for automatic handling during the manufacturing process. Biggest automation strides were made by Ford at new plants in Buffalo, Cleveland, and renovations at The Rouge, as well as new plants under construction in the Detroit area.

But highly publicized as have been the automatic processes, which lend themselves readily to publicity, not every master mechanic is convinced that completely automatic handling is the best method. This has been indicated by engine tooling estimates requested by one of the biggest producers.

In this instance, estimates for single machines are requested as well as for large transfer machines, indicating that both sides of the question are still pending.

Cost Question — Initial factor considered is probably cost. The large transfer machines are more expensive and a change in tooling is also apt to cost more than if single machines are used. Automatic machines are also less flexible and a breakdown is apt to snarl production.

Automen Optimistic on '53

Automotive leaders anticipate a good year in 1953. Typical of the industry's attitude is that of Harlow H. Curtice, acting president, General Motors Corp., who told THE IRON AGE: "I am looking forward with optimism for the automotive industry in 1953. As everyone knows, the industry for the past year-and-a-half has been operating on a restricted basis. That in itself has created a backlog of buyers whose requirements have yet to be satisfied.

"Coupled with that fact is the continuing growth of the population capable of purchasing new automobiles. We feel strongly, therefore, that a substantial market for new automobiles exists in 1953."

Shell molding went on experimentally in General Motors Research, Ford and Packard, to name a few known instances. Progress in this department is one of the most closely guarded secrets in the industry. Look for it to come into the open on a big scale in the New Year.

Plastic dies, for prototype and short run production, made spectacular news in the past year, but still have not stood the test for real production. Indications are that they will be a permanent part of the industry, and 1953 should see them established or by-passed for something better. But whether it is plastic or some other material such as a zinc alloy, the steel die for short runs may be on the way out.

Output—The New Year should see auto production return to about the level of 1951, but not up to the record set in 1950. The past year's totals will be 4,363,710 cars and 1,209,544 trucks, a total of 5,573,254 vehicles produced in the U. S.

An authoritative market source estimates that 5,100,000 cars and 1,200,000 trucks will be produced in 1953, slightly under the 1951 figures. His predictions are based on his contention that sales, not capacity, will control 1953 production.

This will be in strict reverse to the conditions of 1952 when NPA production controls and a nearly disastrous steel strike conspired to keep production down.

In spite of the strike, which brought the automotive plants to their knees during the summer months, late surges enabled most plants to reach their allotted total.

Running Start—Exceptions were generally those who preferred to conserve their tickets for a good start in 1953.

For comparison, the record was set in 1950 when 6,672,141 cars and 1,344,225 trucks were turned out by the booming industry.

In attempting to pick up the production lost to the steel strike, the pressure was on the steel purchasers to get the steel as the competing producers raced to "get there fustest with the mostest."

This led to an immediate revival of conversion, which had largely gone out of the window early in

1952. Foreign steel also made its appearance although most of the deficit was made up in conversion. It is estimated that 350,000 tons of conversion steel was used for automotive purposes in the last quarter of the year.

Outlook—The materials forecast for 1953 for the auto industry indicates that steel will remain tight well into the second quarter. However, it looks from here that steel will start catching up with demand at the time when automotive production will have passed its peak.

The prediction is that steel will be quite free in the latter half of the year and selling will be required. This will mean more rejections, unheard of now, as purchasers demand higher specifications.

There is some fear aluminum may return to the short list. There is little hope for better brightwork as long as the jet engine program eats up all nickel except that needed for functional parts.

There is more steel going into new cars this year. The only weight reductions are due to lighter engines such as new V-8's in Dodge and Buick. Regardless of the lack of nickel for good brightwork, new cars have more of it than ever. Chrome stainless does the work in most cases.

The Race — Defense priorities kept tooling facilities busy on defense work and Dodge and Buick mechanics performed heroic feats in getting new V-8's ready for 1953.

Ford should have a new V-8 ready later in 1953 and may spring it in mid-season to counter Chevrolet's radical styling changes. Pontiac and Chevrolet will also be tooling for new engines, but these will not be ready even for 1954.

Labor Peace—If the secondary effects of the steel strike can be discounted, the auto industry enjoyed a year uninterrupted by labor strife. The same is forecast for 1953 because the famous escalator clauses have more than 2 years to run.

In case anyone needs reminding, the UAW and auto companies have contracts gearing wage rates to the Bureau of Labor Statistics index with an annual productivity factor thrown in.

There will be some tussling by the UAW during the year to have the floor on which the escalator clause is based raised to somewhat nearer the present wage figure.

Though the companies, and the union for that matter, are not required to open the contracts for negotiation until expiration date, there may be some confusion in shifting to the revised BLS consumer price index.

Battle—The big fight within the industry will be between Ford and Chevrolet, with Ford for the first time in postwar years in a position to challenge the champ seriously.

Ford's new production facilities, all fully automated, plus a very popular car, give strength in an open market that it hasn't had in years. But Chevrolet has a new car to show this year that should be very strong. While possibly not as new and modern as Ford's, Chevrolet also has excellent facilities.

Detroit Ready — The part that defense requirements will play in the auto industry in 1953 depends, of course, on decisions made outside of Detroit.

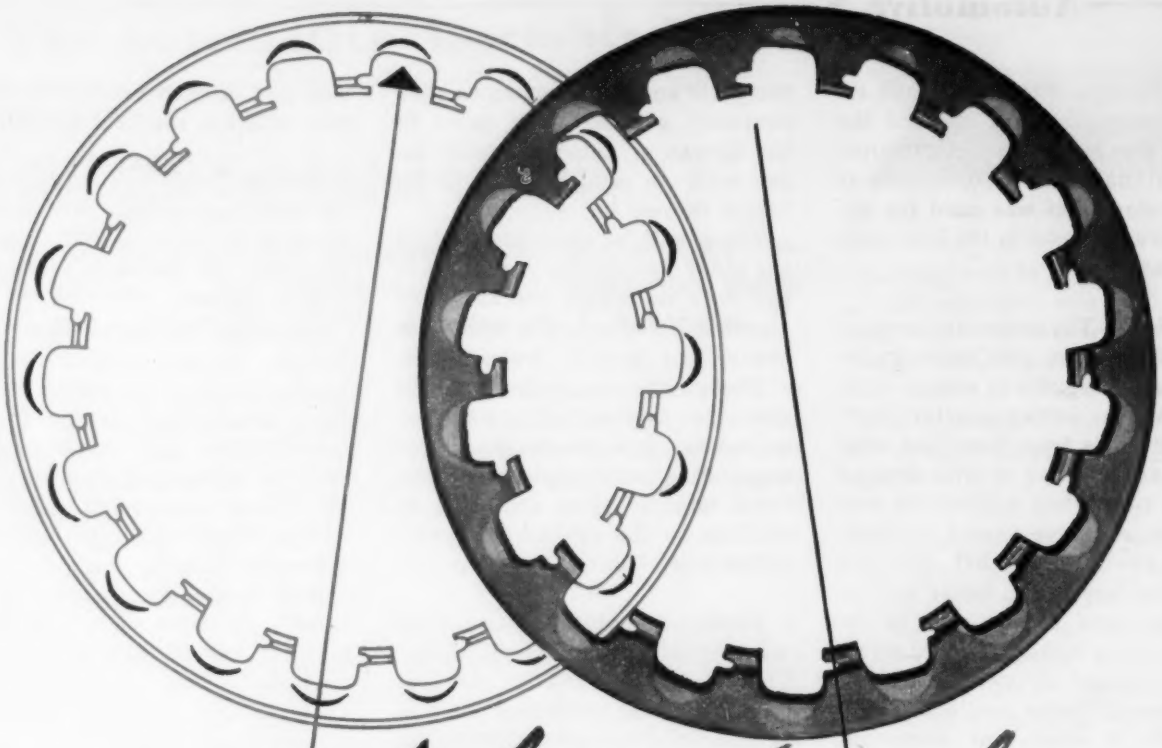
One thing is sure, however. C. E. Wilson, the new Secretary of Defense, will have a better understanding of industry's side. This in no way means that coddling or favoritism is expected. It means that Mr. Wilson is expected to tolerate no foolishness either in the Pentagon or in Detroit.

Auto producers recently experienced a slowdown on both tank and military vehicle production. Barring all-out war, the rate of production in this field will probably stay at the slower pace.

Many new jet engine plants that are being constructed by the auto industry should be ready for production this year. The tooling up phase completed, the industry will be ready for whatever demands the next 12 months bring.

THE BULL OF THE WOODS By J. R. Williams

THERE GOES THE WHISTLE, AND TH' TOIL OF DAY IS OVER FOR THOSE BOYS!
TH' TOIL OF DAY WAS OVER A HALF HOUR AGO FOR THEM BOYS! ANY TIME YOU SEE A BUNCH OF GREASE MONKEYS EXPLODE OUT WITH TH' FIRST BLAST OF TH' WHISTLE LOOKIN' LIKE BANKERS. THERE'S SOME "TOILETTE" TO IT.!
1-2
BORN THIRTY YEARS TOO SOON
J.R.WILLIAMS
Copr. 1953 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.



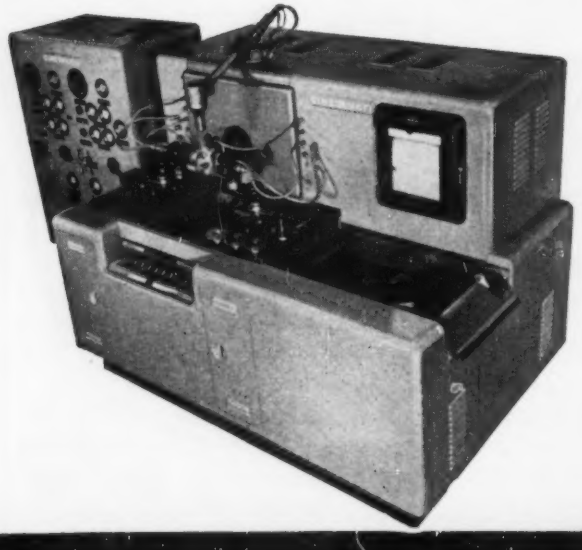
specified | *achieved*

definite hardness pattern | **excellent uniformity**

high production | **60 parts per hour**

distortion next to nothing | **rejects virtually nil**

with flamatic selective surface hardening



If ever there was one, here's a really tough heat treat job. The print called for all 18 internal lobes of this tank transmission cam (SAE 3145) to be hardened to Rc 53-60, body between lobes to remain ductile, pattern so consistent that inspection of only 1% of production would be permissible.

The nital etched section shown above (about half size) clearly shows the results achieved by Flamatic selective hardening. Production of 60 parts per hour was ten times faster than previous method. Scrap losses dropped practically to zero.

Gears, cams, rollers, parts with multiple diameters, etc., up to 18" OD depending on width or shafts up to 24" long depending on OD are readily handled on the Standard Flamatic. Write for Catalog No. M-1724 which includes case histories. Send part prints for analysis and recommendations.

flamatic

THE CINCINNATI MILLING MACHINE C

Cincinnati 9, Ohio, U.S.A. • CINCI NA

Capitol Has Optimistic View

Review
Forecast

Business can look forward to fewer controls, fewer government fingers in business pie . . . No recession in sight . . . Republicans will move with caution—By G. H. Baker.

From the national political viewpoint, the metalworking industries may justifiably "think big" in their 1953 planning. New freedom from controls, less meddling from government agencies, and the probability of lower taxes all add up to a more favorable climate for business.

By exercising alert planning, management this year may anticipate thriving markets, steadily growing demand, and a gradual withdrawal by Washington of the fingers it has been sticking into management's pie in recent years.

Labor-management differences, where they arise, will tend to be ironed out at local levels. Both sides are to learn that little or nothing is to be gained by taking their battles to the White House.

See No Recession — Talk of a business recession is simply not justified, as bipartisan economists at the Capitol see it, for Ike is definitely committed to continue U. S. rearmament on an effective scale. Rate of government procurement may slow as new "stretch-outs" are ordered, but volume of contracts over the long pull is to remain high.

Some "soft spots" in the economy may develop. It would be unrealistic to believe otherwise. But a general business recession is not in the making. Both this year and next will be periods of good business. Defense build-up goals, on the basis of present schedules, should be reached by mid-1953.

And major security expenditures are likely to rise from their present annual rate and remain at higher levels for the next several quarters. New opportunities for economic stability are to appear. Growth, without any major set-backs, is to continue. Some adjustments will have to be made. They'll pose challenging problems for policy-makers in government and in industry.

Economize — It's now definite that the Army, Navy, and Air Force intend to go a little easier on the new Congress in their demands for funds next year. Present indications are that the 3 services will ask for about $43 billion for operating expenses in the fiscal year 1953-54. This figure is about $10 billion less than they asked this year, and is about $6 billion less than actually appropriated.

Approximate breakdown: Army, $12 billion; Navy, $12 billion; Air Force, $19 billion.

But unspent funds remaining from previous years will give the Pentagon a total of about $60 billion in new check-book authority. Some of this money has been appropriated over a period of several years for procurement of such long-range items as supercarriers and research and development of new weapons.

Good Times—On the whole, the "normal" pattern for the years ahead may well be a bounding extension of the "good" years of the recent past. Total demand may well exceed today's record levels. Specifically, the new Administration believes it will be possible for business to raise wages, keep its prices reasonably in line, to have the benefit of tax cuts, lose some military business, and still increase its general level of prosperity.

"I don't care how many letters you've written to Eisenhower. Taxes have not been cut yet and that's that."

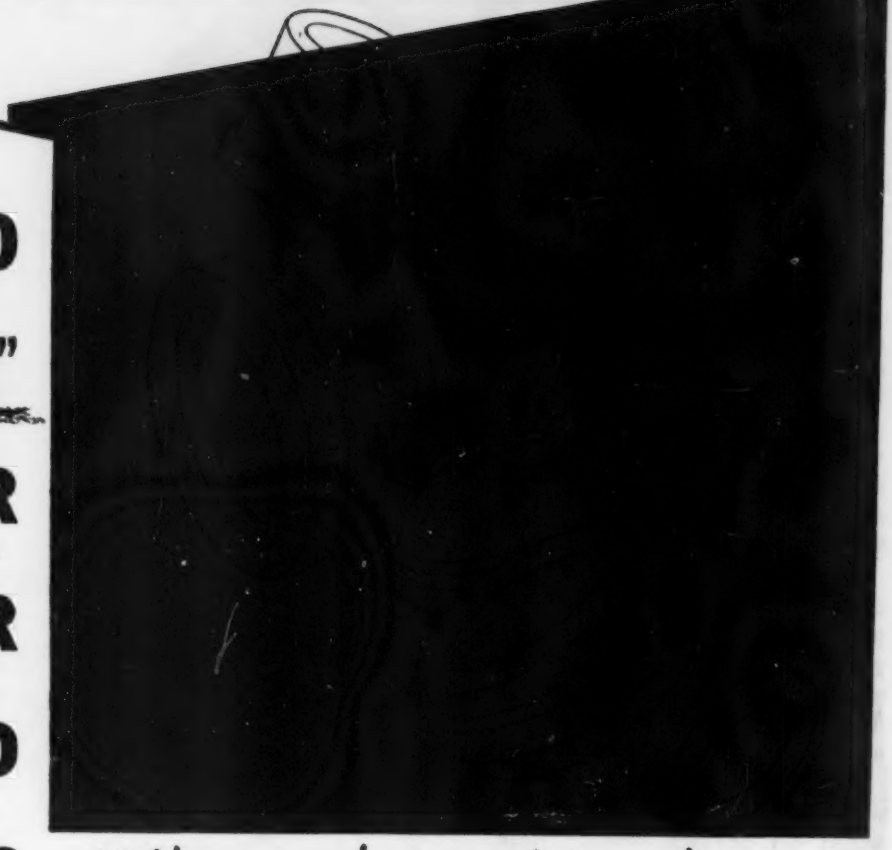
But there are deadfalls to be avoided in the immediate months ahead. Clamor for renewal and strengthening of federal controls will be unleashed by unions and by so-called "professional consumer groups" soon after the new Congress convenes.

Revival? — Biggest noise is to come from groups demanding a revival of price controls. Talk of wage control will be soft-pedaled, only agreed to if full-scale price controls are promised. Some materials controls are to be kept, majority to be jettisoned piece by piece during the first and second quarters of the new year. Rent controls probably will be retained, and standby price controls have a fair chance of winning bipartisan approval from the new Congress.

Argument for retaining price controls over metals and machinery is to run something like this: If controls are not renewed, business will see an "immediate" rise in prices on some 200 items sold mainly to industry and government. Steel, copper, aluminum, and other metals would be affected, as well as machinery and building materials. Pressure groups for this line of thinking do not contemplate ample supplies of any of these items. Demand will continue to outrun supply, they contend.

Labor Law — As far as new labor legislation is concerned, the new leadership in Congress has decided to open up the Taft-Hartley law for amendment this year. Feel-

GO "AMERICAN" FOR CIRCULAR WELDED PRODUCTS



Welding is our business. Let us put our 34 years of experience to work for you.

Complete designing, engineering and metallurgical service is available where fusion or resistance welding of either ferrous or non-ferrous metals is required.

A company you'll like to deal with

THE AMERICAN WELDING & MANUFACTURING CO. · WARREN, OHIO

Send for your copy of our 20 page illustrated catalog

LET US SEND YOU MORE FACTS OR BETTER YET SEND US YOUR SPECIFICATIONS FOR PROMPT QUOTATIONS

ing is that it's inevitable, must be done in 1953 rather than in 1954 when it could become a detrimental campaign issue. No unanimity of opinion on this issue, for a study of the election returns shows that labor leaders still are not in a position to "deliver the vote." Myth that Taft-Hartley is political poison has been exploded. In Congress, 168 out of 173 Taft-Hartley supporters in the House were re-elected. And Senator Taft, R., O., says he is "confident" that the AFL will take a more moderate stand.

Careful—One official sums up the immediate future this way: "The business world may best regard the outcome of the November elections as a reprieve from further trials—not an acquittal."

Now Republicans at the Capitol are moving cautiously. They are painfully aware of the defeat they suffered in 1948 after their 2-year tenure of the Senate and House. In '46, flushed with victory, they slashed control laws from the books with a vigor and haste that obviously dismayed the electorate.

Having paid the penalty of a lost election in 1948, they are now determined to "make haste slowly," to avoid antagonizing the independent voters.

On a point-by-point basis, the forces supporting this overall outlook are now shaping up—as seen by congressional experts — along these lines:

Readjustment following the peak of defense spending is to come less abruptly than it did at the end of World War II. Military spending, now 15 pct of the gross national product, probably won't drop much below 10 pct after the peak has been reached.

Federal deficit is no longer growing by leaps and bounds, as it did in World War II. There's every reason to believe that Ike will balance the budget in 1954.

Business is not faced with the task of reabsorbing large numbers of men into civilian occupations, as was the case in 1946, when about 8 million men were released from military service.

New Idea—Change in administration means an end to the idea that prosperity results only from defense spending. Other factors, such as population growth, are to create new demands, expand old ones. Increases in productivity must, of course, accompany population increases.

Demands for residential housing during the next few years will mean an annual rate of 1 million new starts each year.

Similarly strong demands will continue for new plant and equipment. Even taking into consideration the tremendous gains in productive capacity of the past 3 years, normal growth of markets will require still further expansion moves.

Farmers, Too—Agriculture is to continue enjoying its boom.

Public works construction is to continue at a high level. Pressing demands for new school buildings, in particular, must be satisfied. Normal increase in enrollment during the next 8 years will probably average 27 pct over 1950.

Health needs, too, must be accommodated. At the present rate of population growth, the nation will require a minimum of $14 billion worth of new hospital construction before the end of the decade.

Highway construction has lagged sadly in recent years. Aside from new construction, about $7 billion annually will be required to maintain or modernize existing roads—partly because of obsolescence and partly because of more cars.

"This power shortage is really getting serious."

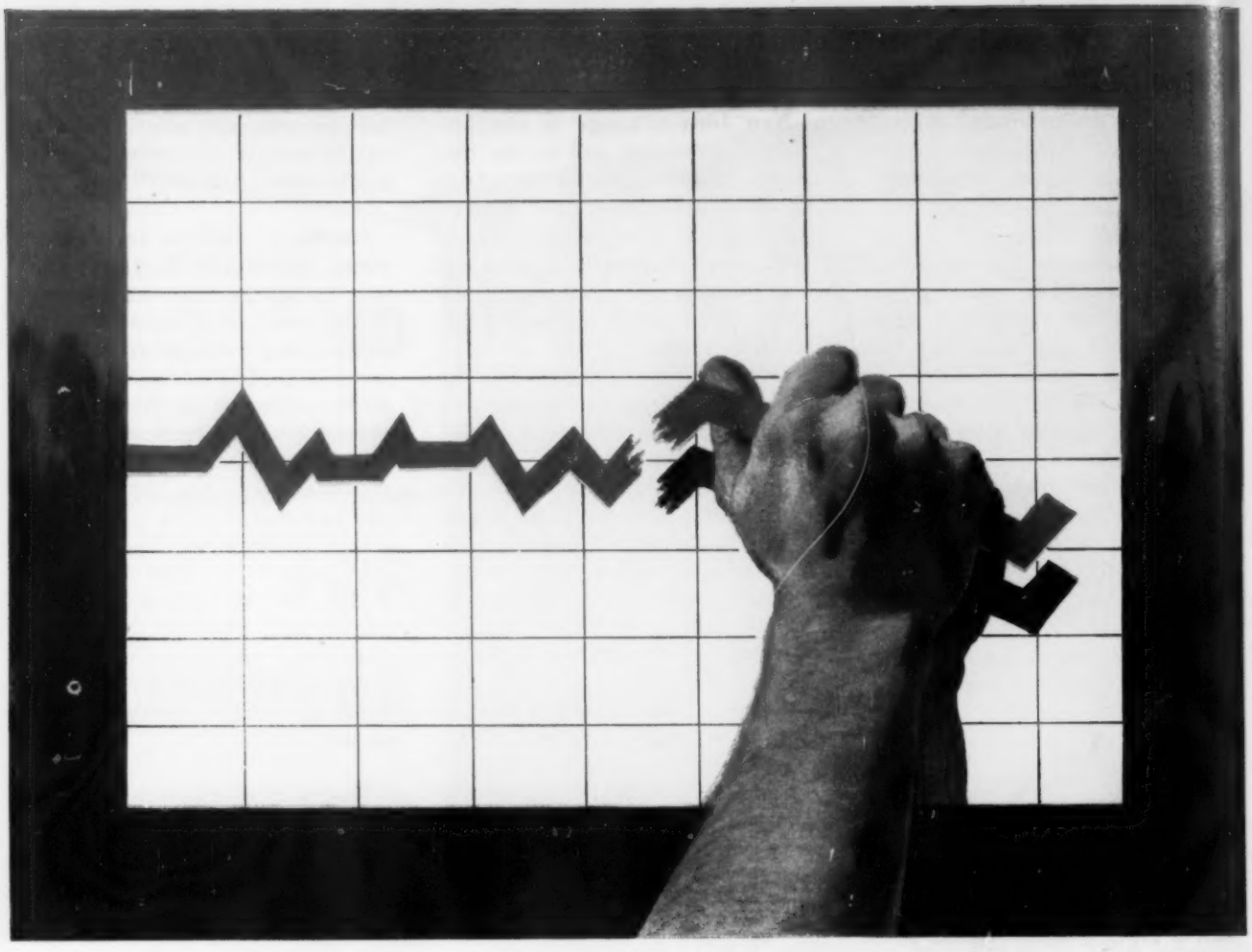
Seaway — Chances for congressional approval of U. S. participation in the St. Lawrence seaway project are to be at least as good in 1953 as they were last year. Sentiment at the Capitol hasn't changed much. Absence in the new Congress of some seaway advocates is just about offset by gains in new potential votes for the venture—and vice versa.

Rep. George A. Dondero, R., Mich., who's to head the House Public Works Committee, says there's still hope of joint U. S.-Canadian entrance into the project. But Canada decided a year ago to build the seaway without U. S. participation.

Tariffs — As for foreign trade and tariffs, the upcoming congressional debates on the subject aren't going to result in any sweeping overthrow of the existing reciprocal trade program. A sizable number of Republican congressmen are being won over to the "trade, not aid" theory of foreign assistance. Result: With a few exceptions, tariff rates are to continue at their present levels.

A few industries—such as pottery—are due for relief under the "escape clause" of the Reciprocal Trade Act. Sinclair Weeks, who will head up the Commerce Dept. starting Jan. 20, favors reciprocal trade in general, but believes the government cannot keep cutting duties if it is going to hurt U. S. business. Actually, there is no question but that the reciprocal trade program will be continued beyond its expiration date of June 12, 1953.

Thesis of the "trade, not aid" philosophy is that the U. S. might as well get on the receiving end of some foreign-made goods in exchange for the dollars being shelled out for economic assistance to non-communist countries. But this plan requires the maintenance by the U. S. of relatively low import duties.



How much tonnage does your down-time steal?

EXCESSIVE down-time for bottom repairs steals precious production time—time when your furnace should be making steel!

You can cut costly repairs, greatly increase your tonnage per year, when you install a bottom of Permanente 165 *periclase* ramming mix.

Bonded by means of crystal-bridging, patented Permanente 165 begins formation of a ceramic bond as low as 1500°F. and gives a *deeper bond* at normal burn-in temperatures—with no formation of fluids.

Because Permanente 165 has a higher MgO content, *higher refractoriness* is retained longer under operating conditions. *High density* is insured by accurately-sized, pre-shrunk periclase grains.

This means you get a better bottom that requires less time and materials for repair, with far less danger of costly breakthroughs.

YOUR Kaiser refractory engineer will give prompt attention to your refractory problem—will offer, where desired, research, design and installation service to give you maximum production most economically. Write for descriptive literature on Permanente 165 and on the companion ramming mix, Permanente 84. Principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

Review
Forecast

West Output 6 Pct. Under 1951

High post-strike ingot rates, plus continued Kaiser operations, bring year's output to 7 million tons . . . Expansions continue with accent on tinplate—*By T. M. Rohan.*

Alltime high ingot rates since the 2-month strike this summer pushed steel output in 1952 to within 5.84 pct of the strike-less 1951 in the 11 western states and Texas.

THE IRON AGE Western District poured an estimated 7,050,000 tons in 1952 compared to 7,468,163 in 1951. But for 1953, western steel mills are shooting for 8,451,271 tons or 20.17 pct over 1952.

Picked Up—U. S. Steel's Columbia-Geneva Div. was running about 10 pct behind 1951 at the start of the fourth quarter. In September it did 15 pct better than 1951 and picked up about 2 pct of the annual figure through December, bringing it within 7 pct of 1951 output.

Bethlehem's all-electric Los Angeles plant had its biggest output in history despite lost strike time. Kaiser continued uninterrupted through the strike and the Colorado Fuel and Iron Corp., through overhaul of handling equipment and other refinements, led all Western mills in operating efficiency for weeks after the strike.

Within the general marketing area of the 7 western states, the traditional gap between local production and consumption widened slightly. Total consumption stayed about 6 million tons, of which only about 3.4 million tons of finished steel were produced in the area, a slight drop from the 1951 figure of 3.6 million. Consumption remained virtually unchanged due to some manufacturing cutbacks, inability to fill demand during the strike.

Expansions—U. S. Steel continued work on additional facilities at the Pittsburg, Calif., sheet and tin mill. A 4-stand mill is being erected alongside the existing 5-stand mill and by taking the sheet load off the original equipment a capacity of about 414,000 tons electrolytic and hot dip tinplate may be reached by March.

Kaiser got its $20 million, 200,000-ton tinplate mill at Fontana in operation early enough to help out in the post-strike tinplate crisis. Its big expansion will come in 1953 when the third blast furnace is blown in, the ninth openhearth started and 90 new coke ovens started.

Judson Steel was slightly over 1951 output. It has two openhearths with a third on standby and is giving consideration to bringing the third into regular service if market conditions warrant.

Pacific States Steel Co. added a third 150-ton openhearth and the two 25-ton electrics are on standby.

Just 6 Months—Northwest Steel Rolling Mills, whose strike lingered after national settlement, felt it had a poor year. But the neighboring Seidelhuber Steel Co. jubilantly proclaimed the best year in its history. With local and RFC backing it had a used 10 in. bar mill in operation 6 months after breaking ground. The firm hopes to have its 24 in. mill going during 1953.

RAILS FOR THE WEST: Part of the rail output at Colorado Fuel & Iron's Pueblo, Colo., plant.

No major additional expansions aside from the U. S. Steel Pittsburg, Calif., tinplate mill and Kaiser expansion have been announced. Geneva needs ingots badly and there is a tremendous market for its products. A large portion of the ingot tonnage generally is diverted to plates rather than hot-rolled sheets.

Since all elements are now fairly well balanced, any major steps would affect the whole mill. Some improvements, rearrangements and modernizations will undoubtedly be made, however. The long-talked-of expansion of the Los Angeles plant will probably not materialize in 1953 due to tremendous investment by U. S. Steel in the Fairless Works.

Bethlehem's Los Angeles plant will probably have an increase in finishing capacity. The three new electric furnaces give it some excess ingot capacity and shipments to other areas have been made.

Getting Bigger—General industrial growth in California continued to hit new peaks for the second straight year. Los Angeles County industrial investments set a new record of $310 million, thus retaining third place nationally in number of factories.

Over 30,000 new jobs were created during 1952 in plants for electronic equipment, aircraft and automotive parts, machined products, foundry products and prefabricated structural steel buildings. Value of products hit over $4 billion. It was also the second greatest construction year, rising 9 pct over 1951.

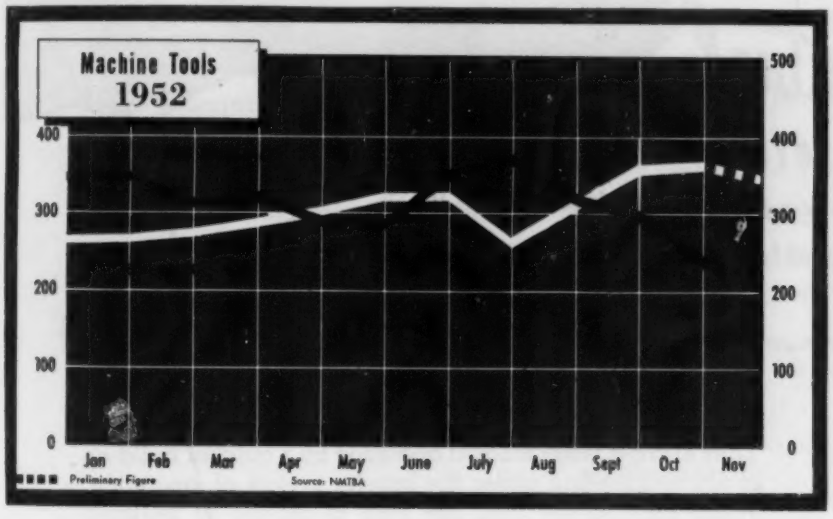
RED RING
INTERNAL-EXTERNAL
GEAR SHAVING
MACHINES
For the Precision
Finishing of Gears
Up To 120" PD
Other models available for gears
up to 220" PD
Red Ring
SPUR AND HELICAL
GEAR SPECIALISTS
•
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM
NATIONAL BROACH & MACHINE CO.
5600 ST. JEAN • DETROIT 13, MICHIGAN

Forecast

Situation Reverses in Year

Machine tool builders hacked down 18-month delivery till it's now normal . . . Backlogs are about 11 months . . . Value of 1952 shipments was $1.2 billion—By *E. C. Beaudet.*

The machine tool industry going into 1953 faces a radically different situation than last year at this time. At the start of 1952 backlogs, valued $1.5 billion, stretched 18 months into the future. Defense orders were still on the upturn and new orders were coming in at a rate greater than shipments.



A wave of government cancellations coming to as much as 30 pct in some early months plus a very high rate of production brought overall industry backlogs down to about 11 months as the year came to a close. Total shipments for 1952 have been valued at $1.2 billion. This represents an increase of almost 100 pct over 1951's shipments of $620 million.

Deliveries Shorter—With industry backlogs steadily coming down, deliveries are becoming progressively better. Demand is still strong for machine tools on the government's "critical" list but even these show signs of being substantially reduced. A good many firms in the industry, particularly those making general purpose equipment, are at present actively seeking business. They are also promising normal delivery.

Backlogs are expected to drop lower during the coming year before an upturn takes place. A loss of capacity will occur during the winter months, according to some sources. There is expected to be a corresponding drop in the amount of subcontracting let by machine tool builders.

War Work—The rate at which the machine tool business operates during 1953 will depend to a great extent upon the amount of business forthcoming from the government. It is expected that in spite of stretchouts of various military programs, government orders will play a substantial part in ballasting order books in 1953. However, some think the ratio of defense orders to civilian business will steadily decline over the next 2 years.

With the machine tool industry for the most part over the hump as far as defense needs are concerned, a greater number of orders from civilian users will be necessary if the industry is to be kept operating at a healthy level. Government relaxation of restrictions on shipments of machine tools to non-rated users both at home and abroad plus application of a 3-month "frozen" period to these orders will enable builders to better fill civilian demand.

This may bring more orders from users formerly thwarted in their purchases by lack of a rating or uncertain delivery. Some sources claim relaxation of these restrictions might release as much as $300 million worth of business on a replacement basis. Greater availability of raw materials may also act as a stimulant to machine tool sales as civilian manufacturers will be able to increase production schedules.

Be Prepared—Although defense orders have been steadily declining a substantial amount of business is still expected from this source. If recommendations of the Vance Committee for building up the productive capacity of the country to prepare for an all-out emergency are followed, a substantial quantity of orders for machine tools will result.

These recommendations call for the build-up of productive capacity rather than the manufacture and storage of military end items. This means that industrial plants would be equipped with machines needed to boost output quickly if an emergency arises.

The machine tools installed at these plants would be maintained by plant personnel. Thus a good start could be achieved in swinging to full defense production. In addition to time savings, greater economies would be effected since machine tools and equipment become obsolete more slowly than end items.

EC&M Booster Controller used with No. 6, Type SW, 65-inch diameter magnet shown at the right.

New EC&M

Booster Control

Speeds Material Handling...

LIFTS A BIGGER LOAD Faster from the Pile—
Discharges it Quickly, too.

EC&M Booster Controllers are supplied with the Type DM "Lift-Drop" (lever-type) Master Switch. The transition from "lifting-voltage" to "carrying-voltage" can be automatically governed by a time-delayed contactor on the Controller-panel, or by manual control of the contactor from a separately mounted push button or foot switch.

Many magnet users are now selecting these new EC&M Booster Controllers to gather a bigger load from the pile. They also get faster magnet operation by a quicker build-up of the magnet-flux under the booster system of operation. When leaving the pile, the load is carried at reduced voltage to the point of discharge.

EC&M Booster Controllers are designed for use with generators capable of delivering a full load voltage of 285-300 volts so that the magnet-terminal voltage will be about 275 volts with the magnet energized. The change of the magnet voltage from the "lifting-value" to the "carrying-value" can be by generator field-weakening or by a series resistor in the magnet circuit: either of which may be controlled automatically, or manually by the operator.

EC&M Booster Magnet Controllers retain the *adjustable* feature for quick release of the load. These controllers can help speed operation and cut costs on new or existing magnet installations. Investigate them today.

WRITE FOR BULLETIN 900

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET ★ CLEVELAND 4, OHIO

WHO TO ASK FOR INFORMATION

ABOUT CINCINNATI MILLING • SURFACE BROACHING • DIE SINKING GRINDING • CUTTER SHARPENING • LAPPING • METAL FORMING • FLAME HARDENING MACHINES

You can save time by telephoning or writing the nearest Cincinnati representative for literature and information about the machines listed above. For your convenience, addresses and telephone numbers are tabulated here. And if you're not familiar with CINCINNATI Milling and Grinding Machines and allied products, ask for a copy of our new general catalog, No. M-1776. You'll need it for reference throughout the year.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

OREGON, PORTLAND
Hallidie Machinery & Equipment Company,
525 N. W. 10th Ave., Phone: Atwater 9641

SOUTH CAROLINA, COLUMBIA
Tidewater Supply Co., Inc.,
807 Gervais St., P. O. Box 1138, Zone E, Phone: 26371

TENNESSEE, CHATTANOOGA 1
Noland Co., Inc.,
115 Market St., Phone: 7-1284

TENNESSEE, MEMPHIS 2
Hays Machine Tool Co.,
269 S. Front St., Phone: 5-8314

TEXAS, DALLAS 1
Dave O'Neall Machinery Co.,
3911 Oaklawn Ave., Phone: Logan 8432

TEXAS, HOUSTON 6
Sam H. Penny Machine Tools
3003 Louisiana St., Phone: Keystone 3839

UTAH, SALT LAKE CITY 10
The Salt Lake Hardware Co.,
105 N. 3rd St., W., P. O. Box 510, Phone: 3-5771

VIRGINIA, NORFOLK 1
Tidewater Supply Co., Inc.,
501-535 W. 24th St., P. O. Box 839, Phone: 27311

WASHINGTON, SEATTLE 4
Hallidie Machinery Co.,
2726 First Ave., S., Phone: Main 2651

CANADIAN REPRESENTATIVES' OFFICES

B. C., VANCOUVER
B. C. Equipment Co., Ltd.
B. C. Equip. Bldg., 551 Howe St., Phone: Marine 2511

MANITOBA, WINNIPEG
Acme-Bertram Machine Tools, Ltd.
312 Power Bldg., 428 Portage Ave., Phone: 925-620

ONTARIO, DUNDAS
Acme-Bertram Machine Tools, Ltd.
Phone: 700

ONTARIO, TORONTO 4
Acme-Bertram Machine Tools, Ltd.,
15 Brandon Ave., Phone: Oliver 3561

ONTARIO, WINDSOR
Acme-Bertram Machine Tools, Ltd.,
16 Imperial Block, Wyandotte St., Phone: 2-1424

QUEBEC, MONTREAL
Acme-Bertram Machine Tools, Ltd.,
319 Drummond Bldg., Phone: Marquette 1356

Our new general catalog No. M-1776 contains information and specifications for all machines in the Cincinnati line. A copy will be sent on request.

ATI

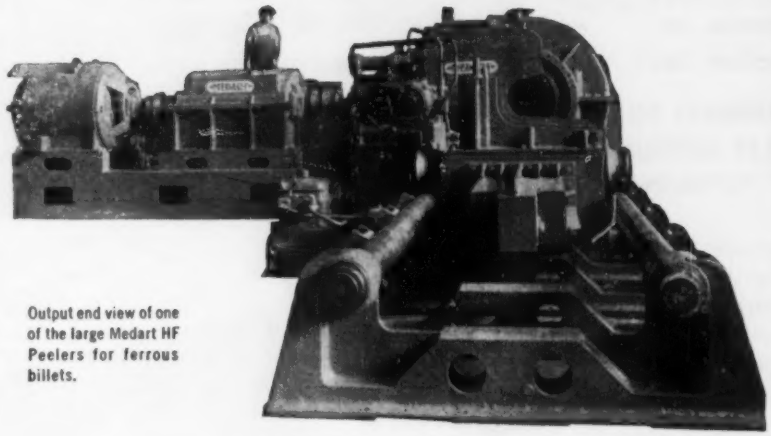
MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID
CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

FILMATIC

Billets Peeled at 20', 30', even 40' Per Minute!

MEDART

MODEL HF
BILLET PEELERS



Output end view of one of the large Medart HF Peelers for ferrous billets.

The output of Medart Billet Peelers is limited only by the capacity of the best available cutting tools! That means the absolute maximum in production at the lowest possible cost!

Built to handle both ferrous billets from 1" to 14" diameter—as well as brass, copper, aluminum and other non-ferrous metals—the throughput speeds of these Medart Peelers range from 1' to 40' per minute, depending upon workpiece size and material. They can be equipped with either one or two cutterheads—arranged for high surface finish or heaviest hogging cuts—and furnished with hydraulic or pneumatic controls, with push-pull feed devices, and for completely automatic operation.

No other scalping or turning machines made can match the production speed or economy of Medart's complete line of Billet Peelers.

Write NOW For Catalog!

THE MEDART COMPANY 3535 DE KALB STREET ST. LOUIS 18, MISSOURI

Free Publications
Continued

Stamping presses

A new 16-p. catalog describing a complete line of stamping presses has been issued by Verson Allsteel Press Co. Condensed specifications are given for standard mechanical and hydraulic presses and press brakes plus data on special machines. *Verson Allsteel Press Co.*

For free copy circle No. 14 on postcard, p. 245.

Compressors

Joy Mfg. Co.'s oil-free compressors are designed for applications where lubricating oil must not contaminate compressed air, such as in instrument control. Outlined in a new bulletin, the Joy compressors are available in vertical, v-vertical and semi-radial models. *Joy Mfg. Co.*

For free copy circle No. 15 on postcard, p. 245.

Power drives

Complete information on Sterling electric power drives is contained in a new bulletin. Among the types presented are variable speed drives, geared motors and constant normal speed motors in drip-proof, splash-proof, totally enclosed and pipe-ventilated designs. *Sterling Electric Motors, Inc.*

For free copy circle No. 16 on postcard, p. 245.

Tool bits

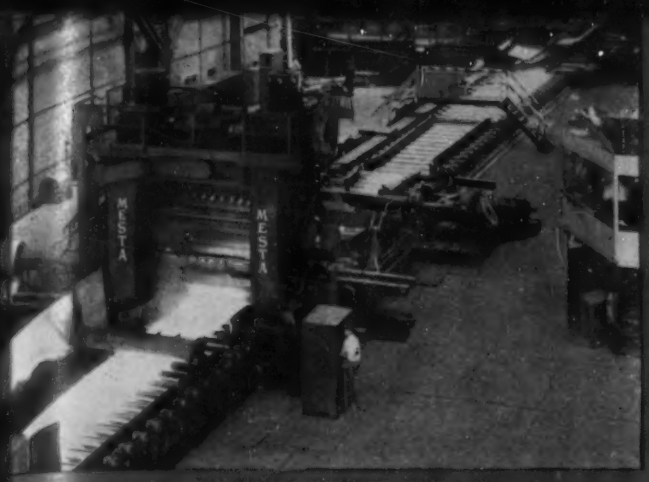
Carbide and high speed tool bits are the subject of a folder released by Whitman & Barnes. The carbide line includes tools for cutting steel, cast iron and nonferrous metals. The company's high speed tool bits are available in square, rectangular and standard cutoff types. *Whitman & Barnes.*

For free copy circle No. 17 on postcard, p. 245.

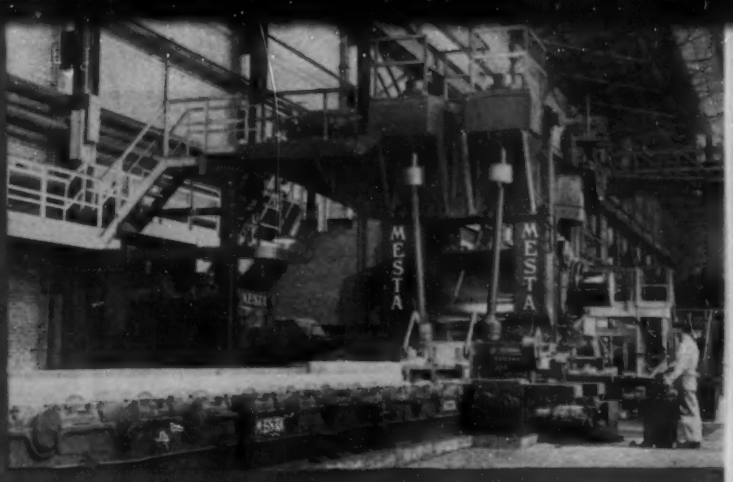
Die casting

Ajax Engineering Corp. has released a 4-p. folder describing the characteristics and operation of a new combination induction holding furnace and pumping unit called Ajaxomatic which is used in die casting aluminum and zinc alloys. The folder shows photos of the unit in operation, the control cabinet and also contains an installation diagram. *Ajax Engineering Corp.*

For free copy circle No. 18 on postcard, p. 245.

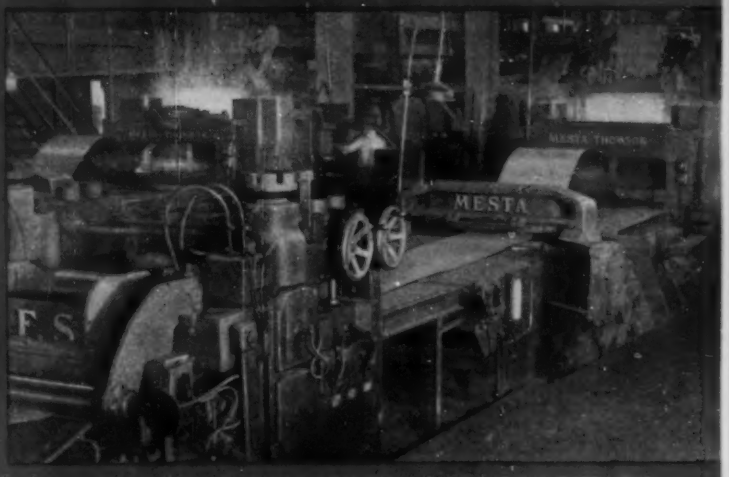


MESTA 110" FOUR-HIGH REVERSING PLATE MILL



MESTA 68" FOUR-HIGH CONTINUOUS HOT STRIP MILL, UNIVERSAL STAND

WORKING A HEAT OF HIGH QUALITY STEEL IN THE MESTA OPEN HEARTH DEPARTMENT

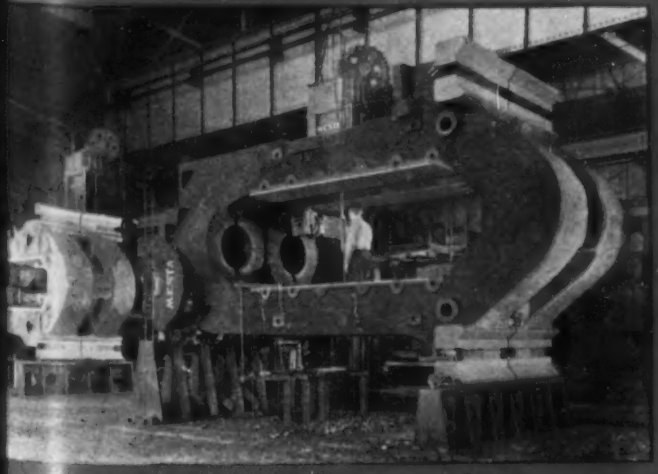


MESTA THOMSON FLASH WELDERS LOCATED AT THE ENTRY END OF TWO MESTA CONTINUOUS PICKLING LINES

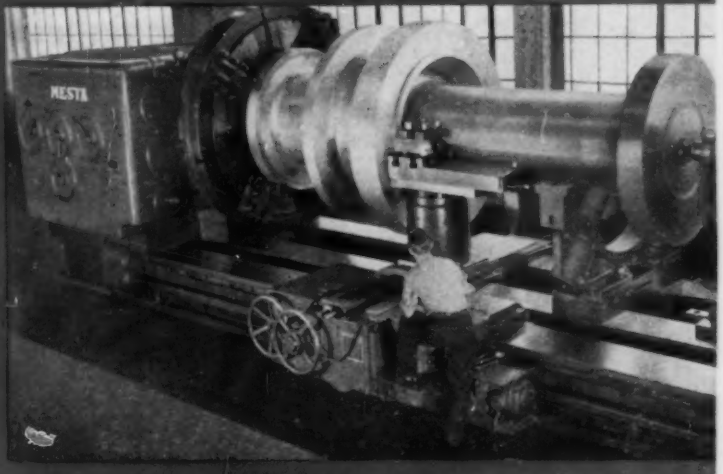
MESTA

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



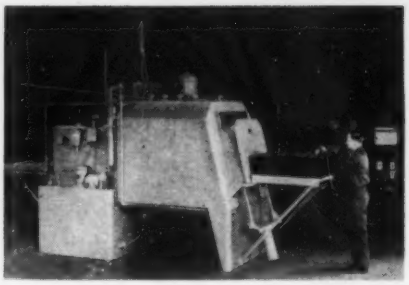
SIMULTANEOUSLY MACHINING ROLLING MILL HOUSINGS IN PAIRS ON MESTA HEAVY DUTY DRAW-CUT SHAPERS



TURNING A MASSIVE ROTOR SHAFT FORGED FROM INGOT POURED IN THE MESTA OPEN HEARTH DEPARTMENT

NEW EQUIPMENT

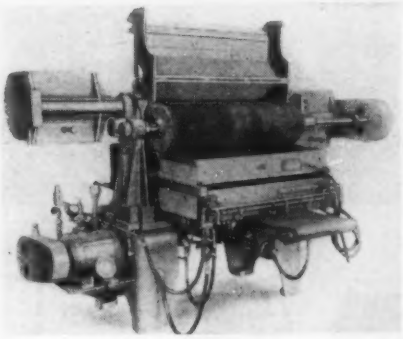
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 245 or 246.



Metal treating by forced convection heating

A new 400 lb per hr automatic heat treating unit features 100 pct forced convection heating. It operates at temperatures up to 1850°F and has complete automatic straight-through operation from heat through cooling or oil quench. The unit is sealed to provide absolute atmosphere control during the entire heating and quench cycle, assuring bright, scale-free work on processes such as carburizing, carbonitriding. Unit handles small lots and long production runs. *Ipsen Industries, Inc.*

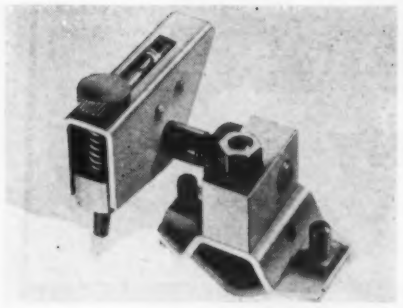
For more data circle No. 19 on postcard, p. 245.



Clair machine surface-finishes hand tools

The Clair Model 206-A surface finishing machine has been developed specifically for surface finishing wrenches, pliers, screw drivers, and other hand tools. It is capable of any surface finishing operation from rough glaze to highly colored mirror reflecting surface. Equipped for either mechanical holding or the use of a magnetic chuck, the machine has been reengineered to increase the horsepower limit to 15, allowing greater surface speeds of the buffs. The machine is single roll design, with spindle 40 in. long and buffs 3 to 12 in. diam. Optional V-belt drive of spindle permits variable surface speeds. *Clair Mfg. Co.*

For more data circle No. 20 on postcard, p. 245.



Device permits bore depth control

Where stops are employed on any turret lathe, hand screw machine or other machine tools the new Pekay Depthmaster permits bore depth control to 0.001 in. The control can be attached to the hand wheel of the machine by the operator or setup man in 1 min. Operating on a gravity principle, the device accurately and clearly records the exact amount of pressure against the stop at all times, giving the operator complete and continuous control of his work down to the last thousandth. It functions on gravity principle; has no moving parts. *Pekay Steel Fabricators.*

For more data circle No. 21 on postcard, p. 245.

Gages inspect root forms on jet blades

Two new gages speed the checking of external and internal pitch diameters of the root forms on jet engine blades and blade carriers. Both units are used as hand gages in conjunction with a standard Air-O-Limit Model F comparator. Both are set to minimum and maximum masters. Design incorporates a carbide roll-type anvil and carbide gaging roll. Gaging point of the blade root gage is a carbide ball point spindle which operates the single air nozzle. Positive location on the blade root is provided by a carbide pressure shoe that spans the point. The carrier gage checks the pitch diameter of the internal root forms in the jet engine blade carrier. *Pratt & Whitney.*

For more data circle No. 22 on postcard, p. 245.

Turn to Page 257

Steel bending rolls

All-steel bending rolls produce commercially true cylinders from thinnest sheets to maximum capacity and can roll bends in various shapes including oval forms, rectangular pipes, rounded end containers and cones. They are pinch type construction which materially reduces flat spots on leading and

trailing edges of the work. All three rolls are power driven. Power adjustment for the rear roll allows the operator to quickly and effortlessly move the roll to proper position for producing any desired radius of curvature. Magnetic brake on the main motor prevents drifting of work, permits rapid reversal and positive jogging of rolls. The rolls are made in three sizes. *Niagara Machine & Tool Works.*

For more data circle No. 23 on postcard, p. 245.

Emulsion cleaner

Pennsalt EC-54, a new emulsion cleaner, will not boil off, evaporate or flash at use temperatures. It cleans nonferrous metals without tarnishing and will protect ferrous parts from in-plant rusting. Flash point is 260°F, fire point 300°F, 95 pct boils within range of 500° to 600°F. Is for use in power washing units at concentration of from 1-to-20 to 1-to-100 with water, at a temperature 160° to 200°F. *Pennsylvania Saft Mfg. Co.*

For more data circle No. 24 on postcard, p. 245.

Marking ink

Ink in a ball point burst proof tube permanently marks metal, wood, plastics. Different sizes of ball points are available and the ink can be obtained in six different colors. Marks on metal withstand weathering, rough handling and hard usage. *John P. Nissen, Jr., Co.*

For more data circle No. 25 on postcard, p. 245.

Safety goggles

Safety goggles for use in light industrial and laboratory operations provide frontal and lateral protection through a clear plastic lens and transparent, green, vented binders which fit snugly to the face. The wearer has a clear view in front and can readily see to the side though eyes are shielded against glare by the binders. *American Optical Co.*

For more data circle No. 26 on postcard, p. 245.

Stone-like surfacing

Ceilcrete, a new trowelled-on surfacing material is a combination of synthetic liquid resin, inert fillers and pigments which cures into a hard dense stone like corrosion proof surface that will withstand trucking, foot traffic and abrasion. Its rated load carrying strength is reported to be about four times greater than that of dense concrete. Its greatest usefulness is in its application to walls and floors that are subject to corrosive liquids or atmosphere. The material is applied in a single layer ⅛ in. thick. *Ceilcote Co.*

For more data circle No. 27 on postcard, p. 245.

Metal hardness tester

On-the-job metal hardness testing is possible with a new Ernst portable tester which gives direct dial reading in Rockwell 15N scale, 70-95. The instrument is placed on the material to be tested, pressed downwards by the handgrips. It has a spring-loaded diamond penetrator indentor. Readings appear on a 2-in. diam scale. *Newage International, Inc.*

For more data circle No. 28 on postcard, p. 245.

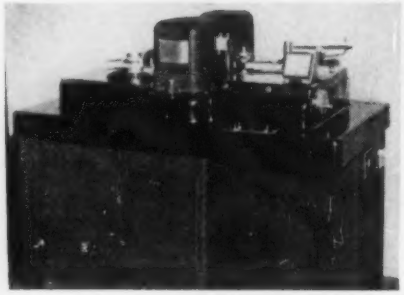
Turn Page

P&H OVERHEAD CRANES
P&H
Electrically Better, Too!
Structural strength? You can take that for granted. But look closely to the electrical equipment. That's the important factor in overhead crane service. That's why P&H builds its own electrical equipment — designed exclusively for crane operation, not adapted for it. Experience is the reason for P&H leadership — experience in building and servicing more than 18,000 electric cranes — far more than any other. You make no mistake when you let P&H build the entire crane — and take the complete responsibility for service.
P&H MAGNETORQUE® AC Crane Control provides the finest known speed-load characteristics.
Write for Bulletin C-6
P&H OVERHEAD CRANE DIVISION
HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

Precision casting for the jet aircraft field

New investment casting furnace consists of melting chamber and transformer combined into a single unit. The melting chamber has a two-piece refractory seated in a granular insulation and is provided with tubular entrances for electrodes and for pouring. The investment mold clamps onto the shell face plate by means of compressed air. Transformer is a 17 kva adjustable reactance, Class B dry type, available for 220 or 440 v, 60 or 50 cycle, single phase supply. The operator pours the heat by inverting the furnace and allowing the molten metal to run into the clamped-on mold. As soon as the casting has solidified, the operator releases the air pressure and removes the mold. Integrating kw-hr meter indicates the progress of heat. Indicating watt meter gives rate of energy input. *Detroit Electric Furnace Div., Kuhlman Electric Co.*

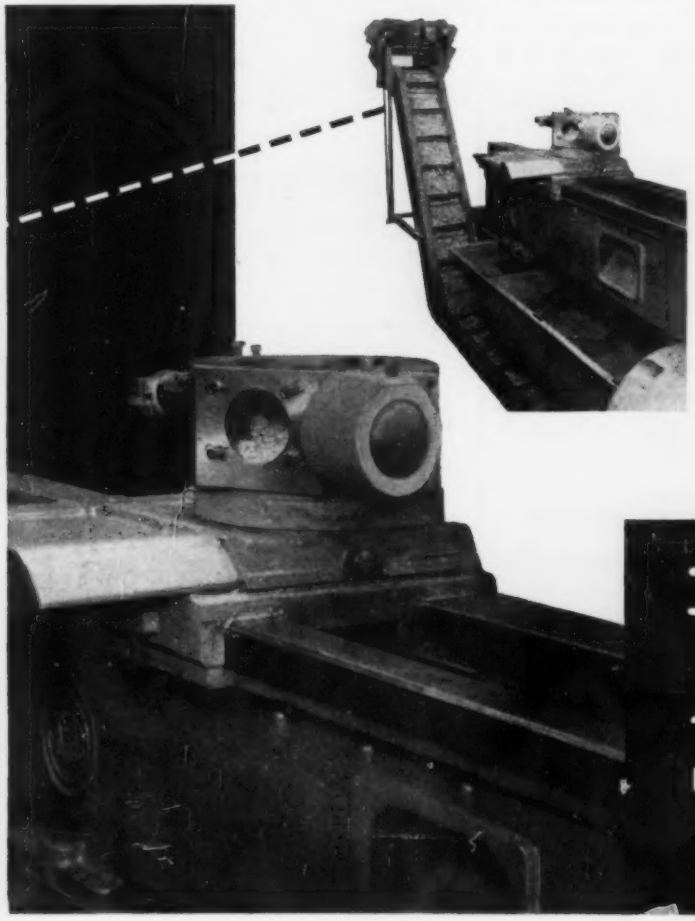
For more data circle No. 29 on postcard, p. 245.



New 90° spectrometer for X-ray analysis

A Norelco 90° Geiger-counter X-ray spectrometer provides at minimum cost a powerful analysis tool for use in research and production control. Designed to provide a full standard range of operation, the new instrument employs a long-life air-cooled X-ray tube and a goniometer having a 130 mm radius. Angular range is −10° to +90°. Angles can be read directly from a dial or from a strip chart; can be varied quickly by manual or motor drive. The Geiger-counter position is continuously readable to 0.01° over range. *North American Philips Co., Inc.*

For more data circle No. 30 on postcard, p. 245.



The CHIP-TOTE has eliminated both machine down-time for scrap removal and manual scrap handling at the General Electric plant in Erie, Pa.

In this installation, brass chips from automatic lathe are funneled onto CHIP-TOTE's hinged-steel belt while lathe is operating. They are carried horizontally until clear of machine's mechanism and then up an incline for discharge into tote boxes. The CHIP-TOTE is synchronized with lathe's metal removing capacity to assure continuous jam-free chip removal. For maximum safety of operation, the chip conveyor is equipped with an adjustable clutch that disengages if pre-set load limit is exceeded.

903-MF

Write today for the new CHIP-TOTE catalog.

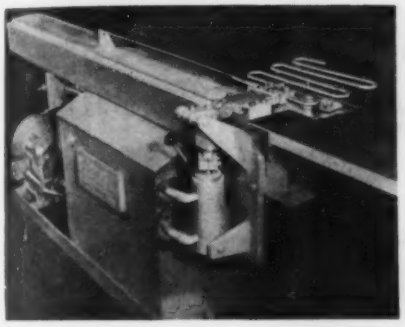
MAY-FRAN

ENGINEERING INCORPORATED

1698 CLARKSTONE ROAD • CLEVELAND 12, OHIO

Work table for induction heating

New line of standard work tables are designed to integrate the operations of work-handling equipment with the new 25 kw RF generator. The table accommodates a wide variety of workhandling equipment and incorporates the control circuits that are necessary for automatic or semi-automatic induction heating operations. A transfer switch is used for constant switching of power from one work position to another. Quench plumbing is built into the table together with automatic control valves. Only necessary installation connections are water supply and drain. Tables are available with sink tops for quench operations, or with flat transite tops. *Westinghouse Electric Corp.*



Bender simplifies serpentine coil bending

Inexpensive, small bender is designed to fit production line needs. It is semi-automatic, equipped with a single control lever, a stationary bending form, a rotating wiping shoe, and a semi-circular table to maintain long coils in a horizontal position during the sweep of the bending cycle. In bending continuous serpentine coils, the first bend is completed in a conventional manner, after which the stock is rotated 180° before clamping for succeeding bends. One movement of the operating lever initiates the entire clamping and bending cycle. *Pine Engineering Co., Inc.*

For more data circle No. 32 on postcard, p. 245.

how the MAY-FRAN

CHIP-TOTE

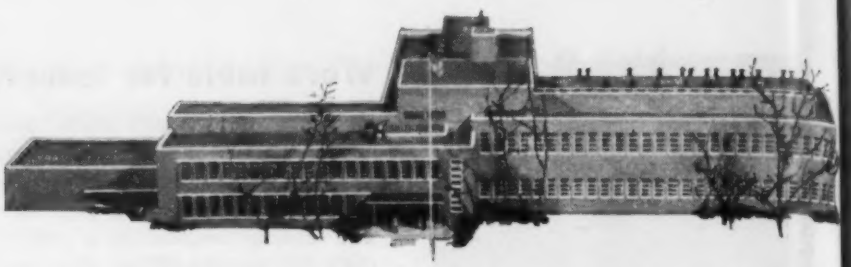
works for INDUSTRY

AUTOMATIC SCRAP REMOVAL STEPS-UP PRODUCTION

CHIP-TOTES can remove borings, turnings and chips from practically all high-production machine tools while they are operating. These time-saving conveyor units are assembled from stocked component parts to meet specific requirements of each application. Their design permits flexibility of installation according to type of machine tool, type of metal scrap, rate of removal, coolant flow, available space, etc.

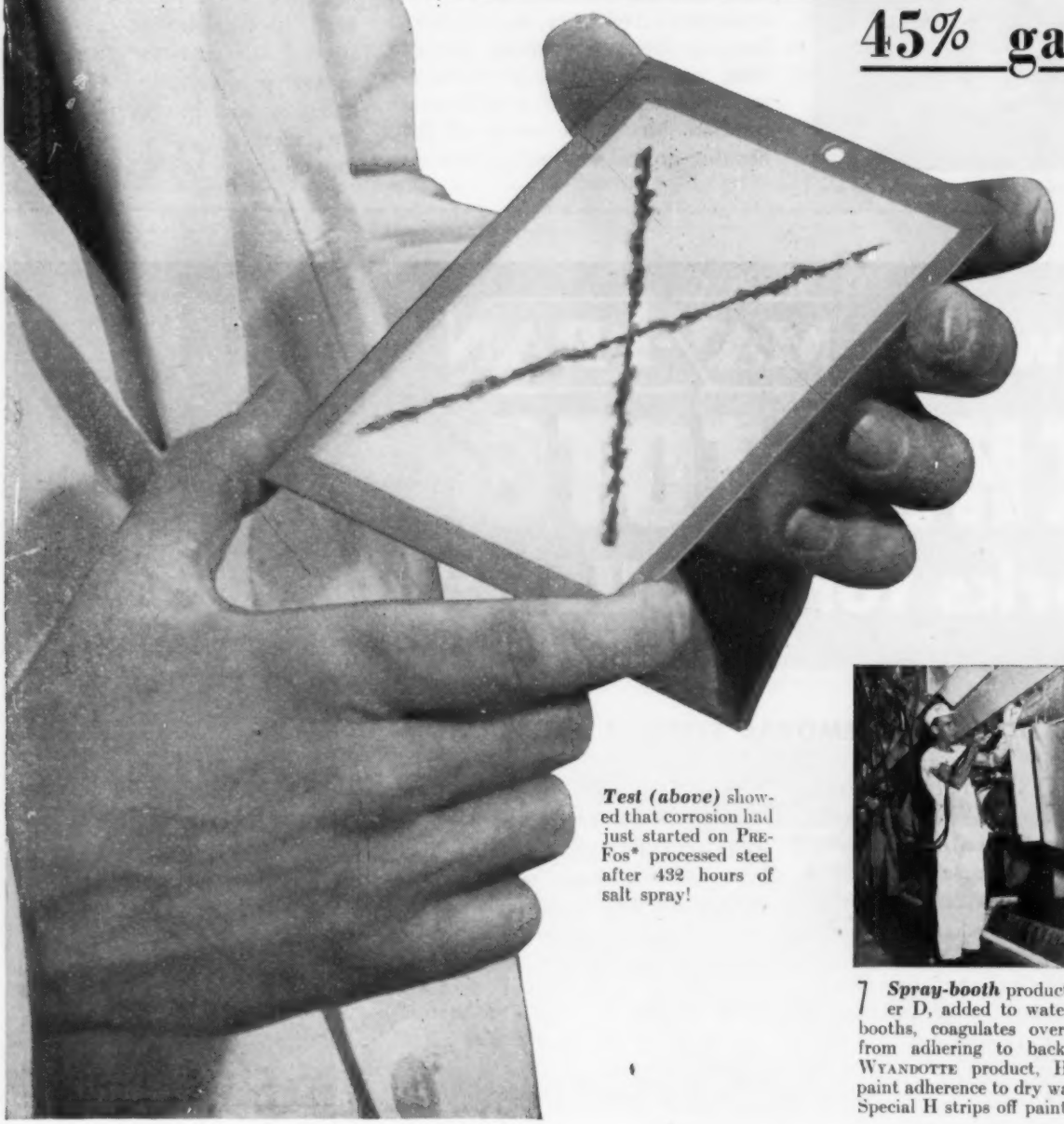
CHIP-TOTES employ patented MAY-FRAN hinged-steel belting, which features interlocking side-wing design to prevent chip fall-through and assure continuous trouble-free operation. Perforated links can be furnished to permit drainage of coolant from chips.

WYANDOTTE
CHEMICALS



1 *New* WYANDOTTE CHEMICALS research building (above) houses finest facilities in the industry for testing and development of cleaning products and processes for Aviation, Railway and Metal Finishing Industries.

Read these FACTS behind 45% gain in



Test (above) showed that corrosion had just started on PRE-Fos* processed steel after 432 hours of salt spray!

7 ***Spray-booth*** products: Metal Cleaner D, added to water in water-wash booths, coagulates overspray, keeps it from adhering to back wall. Another WYANDOTTE product, Hedral, prevents paint adherence to dry walls. WYANDOTTE Special H strips off paint.

The Iron Age

SALUTES

Charles E. Wilson

This hardworking and imaginative administrator gets all the facts, then makes decisions which stick.

THE man who promised to give the job of Secretary of Defense "the damndest whirl it ever had" is frequently characterized as the big man with the common touch.

Slow-speaking and completely unassuming, C. E. Wilson's outward appearance is not that of a high pressure industrialist. But in his 12 years as head of the nation's largest manufacturing company, his record as a brilliant administrator and imaginative executive stands by itself.

C. E. left General Motors at the height of his career. At 62, he had 3 more years before reaching retirement age. He had led GM through some of its toughest years. His accomplishments will give him valuable experience for his new job.

During World War II his company handled about $12 billion in defense orders. He was the first to recognize the concept of dual purpose plants. These he believes will avoid expensive emergency measures to meet recurring emergencies.

The Pentagon will learn that C. E. never jumps to conclusions. He never acts until he has all the facts, but when he makes a decision it sticks. He may plan to give his three departments some of the autonomy his divisions had at GM. He sets policy and expects it to be carried out.

C. E. is one of the hardest workers in industry and has little time for his favorite recreations, hunting, bowling, and bridge. The Wilsons have a large family, six children and 13 grandchildren. His friendship with Arthur Godfrey is well known. He is a graduate of Carnegie Tech and worked at Westinghouse before joining GM in 1919.

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2157 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS carried by LEADING DISTRIBUTORS

* **SPECIALS** furnished to BLUE PRINT SPECIFICATIONS

WRITE FOR INFORMATION

SEND FOR SAMPLES

The Iron Age

INTRODUCES

Hugh Sutherland Lewis, becomes president, Michigan Limestone Div., U. S. STEEL CO., Cleveland. He will succeed Irvin L. Clymer, who is retiring.

Glenn E. Seidel, elected a vice-president in charge of engineering, Minneapolis plants, MINNEAPOLIS-HONEYWELL REGULATOR CO.

J. F. Knoff, appointed vice-president and general sales manager, Airtemp Div., CHRYSLER CORP., Dayton.

Sydney L. Hall, becomes vice-president-administration, C L E V I T E CORP., Cleveland.

Paul E. Parks, elected director, INDUSTRIAL FORGE & STEEL, INC., Canton, Ohio, subsidiary of Barium Steel Corp.

Charles H. Carroll, named director of purchasing, FORD MOTOR CO., Detroit.

Roy W. Winters, named vice-president-sales, "VISUAL" PLANNING EQUIPMENT CO., INC., Oakmont, Pa.

Karl L. Mason, promoted to assistant research director, CATERPILLAR TRACTOR CO., Peoria, Ill.; **H. A. Shelby,** appointed general credit manager; and **R. H. Deffenbaugh,** named general credit manager also.

Hugh J. Mathews, appointed plant manager, Stamford, Conn., newly formed Yale Lock and Hardware Div., THE YALE & TOWNE MFG. CO.; **John E. Charleson,** named plant manager, Lenoir City, Tenn.

Gerald Walter, becomes sales engineer, Detroit office, THE BASSICK CO., Bridgeport.

Jack Harris, appointed district engineer, KSM PRODUCTS, INC., Merchantville, N. J.

Roland H. Cline, appointed manager, Charlotte district office, General Machinery Div., ALLIS-CHALMERS MFG. CO., Milwaukee.

George C. Davis, Jr., named assistant general sales manager, Chemical Div., KAISER ALUMINUM & CHEMI-CAL SALES, INC., Oakland, Calif.

Robert T. Smith, appointed executive salesman, WHITTAKER, CLARK & DANIELS, INC., New York.

Jack J. Rowe, appointed district manager, Cleveland area, DEWALT INC., subsidiary of American Machine & Foundry Co.

W. J. Hegerty, appointed to position of sales manager, Chemical and Process Equipment Div., COLONIAL IRON WORKS CO., Cleveland.

Hal R. Sheaffer, joins the staff of METALS DISINTEGRATING CO., INC., Elizabeth, N. J.

Edmund C. Horman, named regional sales manager, New York metroplitan area, THE BAKER-RAULANG CO.

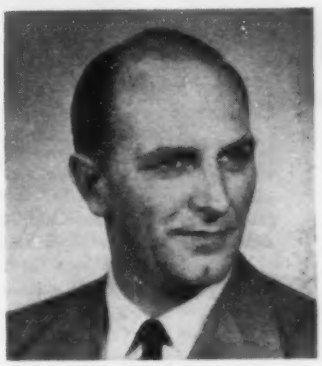
E. T. Houlihan, appointed manager, Industrial and Refrigeration Dept., TACO HEATERS, INC., Providence, R. I.; **Robert T. Angevine,** named assistant sales manager; **Howard E. Lucas,** made regional sales manager; and **William J. Sliney,** appointed regional sales manager also.

Frank R. Adams, appointed field engineer, Saginaw, Mich., territory, THE BELLOWS CO.

Dorian Shainin, and **Franklin E. Satterthwaite,** have joined RATHE & STRONG, INC., Boston.

GEORGE W. WOLF, elected president, Isthmian Steamship Co., subsidiary of U. S. Steel Co. He remains president of U. S. Steel Export Co.

EDWARD M. NORTON, named administrative assistant to the manager, Armco Steel Corp., Middletown, Ohio.



LEO J. PANTAS, named general manager, new Yale Lock & Hardware Div., The Yale & Towne Mfg. Co., New York.

Personnel

Continued

William A. Kerr, elected general manager, TRACELAB, INC., Boston; **Richard A. Lowe**, promoted to sales manager; and **Thomas L. Kelley**, appointed assistant sales manager, Berkeley, Calif.

Dallas Amburn, named assistant to sales managers for industrial resins, Plaskon Div., LIBBEY-OWENS-FORD GLASS CO., Toledo.

Arthur N. Sudduth, becomes manager, new Abrasive Div., WHITTAKER, CLARK & DANIELS, INC., New York.

Richard A. Modig, appointed general sales manager, HOLO-KROME SCREW CORP., Hartford, Conn.

James W. Wilcock, appointed assistant general sales manager, MCKAY CO., Pittsburgh.

Robert M. Blanding, named special representative in charge of customer relations, PIONEER IRON & METAL CO., Milwaukee.

H. S. Glasby, appointed Philadelphia representative, ROCKFORD SCREW PRODUCTS CO., Rockford, Ill.

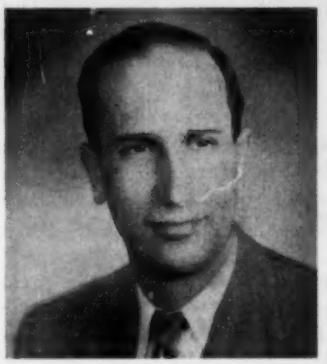
Thomas A. Stratford, named manager, advertising and public relations, THE AMERICAN WELDING & MFG. CO., Warren, Ohio.

Joseph E. Lang, made national representative, eastern market area, STONE CONTAINER CORP., Chicago.

William O'Neill, Jr., appointed plant manager new battery factory, Cold Spring, N. Y., SONOTONE CORP.

Morris L. Hutchens, made chief engineer, Special Machinery Div., KEARNEY & TRECKER, Milwaukee; **Walter J. Hubbes**, appointed superintendent of manufacturing operations; **Harold W. Kippers**, elected to direct sales activities; and **John P. Bunce**, named staff assistant to division manager.

WILLIAM G. BEILBY, director of Industrial Relations, The New York Air Brake Co., Watertown Div.



DAVID B. ZIPSER, appointed chief engineer, Refrigeration Div., Tenney Engineering, Inc., Newark.

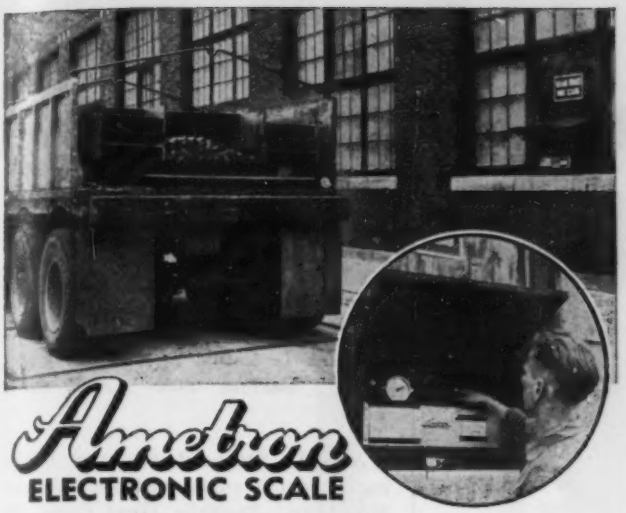
FRANK BURDETT, appointed superintendent, Processing Dept., Armco Steel Corp., Middletown.

WILLIAM G. WELLS, promoted to works manager, Harris Div., Cleveland, Harris-Seybold Co.

Turn to P. 270

The booklet contains engineering data on rivetless chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs.; of drop-forged steel, alloy or cast chrome-manganese steels. Wilmot not only stocks the largest choice of chain sizes, but also furnishes the widest range of other conveyor parts: sprockets, traction wheels, flights, take-ups, shafting, bearings and trough in cast iron, ductile iron, carbon or chrome-manganese steel to fit the application. See why an increasing number of leading firms are cutting "down" time by depending on Wilmot for all conveyor replacement parts.

WILMOT ENGINEERING CO. HAZLETON, PA. Foundry and Shops: WHITE HAVEN, PA.



Ametron
ELECTRONIC SCALE

REDUCE INSTALLATION, OPERATING AND MAINTENANCE COSTS . . .

This typical electronic scale installation shows how industry is switching to electronics for heavy weighing. Requires no levers, beam rods, bearings, etc. Sturdy, compact load cells—with huge weight capacities — do the job! The Ametron Recorder (which can be remotely located) automatically prints the exact weight on tape, tickets or ledger cards.

Driver slips load ticket into recorder to print exact weight.

Write for free Ametron Brochure B

Branches in Pittsburgh and Allentown, Pa. and Birmingham, Ala.

THE STANDARD OF ACCURACY SINCE 1888

STREETER-AMET COMPANY

4101 RAVENSWOOD AVENUE • CHICAGO 13, ILLINOIS

REVCO SUB-ZERO CHEST TO -95° BELOW ZERO

FOR SHRINK FITS

SEASONING GAUGES and PRECISION TOOLS

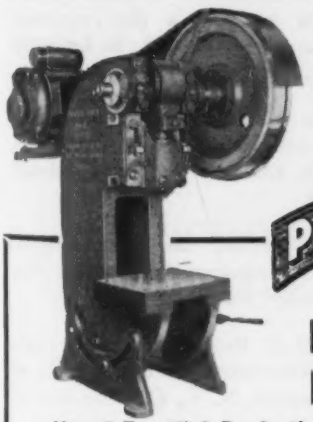
FOR TESTS

Completely equipped ready for operation. The 1.5 Cu. Ft. model as shown handles parts or assembled units up to 23″ long, 12½″ deep x 9″ high and the 6.5 Cu. Ft. model up to 47″ lengths, 16″ deep x 15″ high. Revco Sub-Zero Chests meet highest performance standards featuring temperatures of 95° and 85° below zero while running continuously in normal room temperatures. Other controlled low-temperatures readily attained.

REVCO RIVET COOLER for aircraft application is equipped with 90 rivet canisters in six convenient removable racks. Operates efficiently at temperatures as low as minus 35° F.

WRITE FOR DATA AND PRICES.

REVCO, INC... DEERFIELD, MICHIGAN



It's New . . . with more FEATURES

PRESS-RITE 5 TON High-Production POWER PRESS

New 5 Ton High-Production Press-Rite Bench Model
(Floor Model also available)

You'll get more production at lower cost from this new 5 Ton press . . . loaded with extra features such as:

- **Roller Bearing Flywheel—For long, maintenance-free operation.**
- **Automatic Brake — For greater safety, increased operator confidence.**
- **Special Alloy Frame — For maximum rigidity, minimum deflection.**
- **Easily Adjustable Ball Screw and Clamping Arrangement — For faster setting of precision dies.**
- **Greater Shut Height — For easier accommodation of bulky dies.**

Small and compact, yet ruggedly built for long hard usage, the new Press-Rite 5 Ton High-Production Power Press is ideal for punching, stamping, forming, blanking and drawing operations. No other 5 Ton press has so many features you want for long trouble-free service. Let us mail you our new bulletin P-552 today.

You'll want to see the special features of this outstanding new press. Press-Rite 8 Models. Capacities 5 to 85 Tons.

Sales Service Machine Tool Co. SSMT

PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS

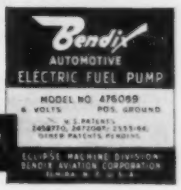
2353 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA

Specify and Use MEYERCORD DECALS to...

warn

instruct

identify



Low Cost...Durable...All Colors, All Surfaces

Among the many new applications of decals for American industry is the tough Meyercord acid, chemical and weather resistant identification of dangerous chemical containers. If you process and ship dangerous chemicals, be sure to ask for full information.

Meyercord Decals have been adopted by cost-conscious manufacturers in thousands of industries...as nameplates, trademarks, instructions, markers, wiring diagrams, safety warnings and many other important applications.

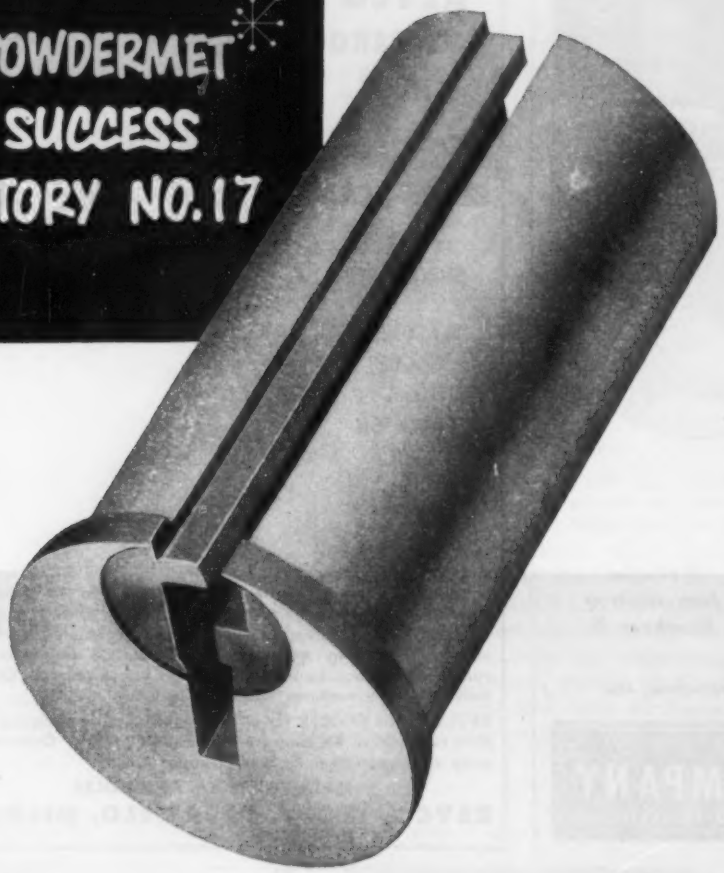
But "just any decal" won't do the job on "just any surface". For today's rigid requirements, Meyercord Decals are carefully laboratory-engineered to assure complete and perfect adhesion to any commercial surface or finish. Write us for information on our complete technical consultation and designing services.

FREE CATALOG
Shows hundreds of uses for durable, washable decal nameplates. Write

THE MEYERCORD CO.
World's Largest Decalcomania Manufacturers

DEPT. A-313, 5323 WEST LAKE STREET, CHICAGO 44, ILLINOIS

POWDERMET* SUCCESS STORY NO. 17



HOLDING LOCK PLUG TOLERANCES TO ±.0005"!

Formerly the manufacturer had to broach these small lock plugs in order to hold a tolerance of plus or minus .0005". Naturally the machining operation was costly and time-consuming. It was obviously desirable to use powdered metal but because of the extremely close tolerances it was considered unworkable.

Then they came to Powdered Metal Products Corporation of America and discovered PMP could supply plugs to the required tolerances and still substantially lower the cost. There was no sacrifice of quality or wear characteristics. In fact the PMP plug withstands repeated tests of over 500,000 cycles—much more than encountered in normal use.

If you have a problem involving production parts, why not consult Powdered Metal Products? Their complete facilities assure finest results.

Write today for complete information.

sign of leadership PMP in powder metallurgy

POWDERED METAL PRODUCTS CORPORATION *of America*

9335 West Belmont Avenue,
Franklin Park, Illinois

*Trademark

Personnel

Continued

Robert M. Cyne, appointed midwestern sales manager, WHITE METAL MFG. CO., Hoboken, N. J.

Mel Olson, appointed purchasing agent, THE MIDLAND CO., South Milwaukee, Wis.

OBITUARIES

Frank L. Estep, 76, consulting engineer, Barium Steel Corp., New York.

Alex U. Steenrod, 62, steel building products sales manager, Berger Mfg. Div., Republic Steel Corp., in Columbus, Ohio.

Willard H. Rother, 67, national authority on gray iron and caustic soda, chief metallurgist for Buflovale Equipt. Div., Blaw-Knox Co., Buffalo, recently in Toledo Hospital.

John Robert Wilks, 69, secretary and treasurer, General Steel Tank Co., unexpectedly at his home in Birmingham, Ala.

Lucien E. Eaton, 73, engineer, Cleveland-Cliffs Iron Co., Milton, Mass.

Francis A. Bell, a vice-president, Cleveland-Cliffs Iron Co., in Lakeside Hospital after a month's illness.

Clifton G. Bigwood, director and vice-president in charge of operations, The L. S. Starrett Co., Athol, Mass., suddenly.

James Taylor, 58, metallurgical engineer, American Locomotive Co., Schenectady, plant.

Kendall B. Rowell, 52, chief engigineer, American Locomotive Co., at Ellis Hospital, N. Y., after an illness.

John L. Bray, 62, professor of metallurgy, Purdue University, at his home in West Lafayette, after an extended illness.

Alfred M. Jones, Midwest sales representative, International Graphite & Electrode Div., Speer Carbon Co.

Thomas Sudduth, 38, manager of labor relations department, Ingalls Shipbuilding Corp., Pascagoula, Miss., recently.

R. W. Vonasch, manager, Federal and Marine Dept., Ward Leonard Electric Co., Mt. Vernon, N. Y., suddenly.

Review

Review Forecast

Here in condensed form are the important 1952 metalworking developments plus coming advances and trends to watch this year.

BUSINESS ROUNDUP

Outlook—Metalworking sales pie should be plumper than ever . . . . p. 274
Competition—Expect hard selling, emphasizing civilian business . . . p. 275
Materials—Metals will be more plentiful; controls will fade away . . . p. 276

METALS AND MATERIALS

Ore—Strike deficit overcome. Taconite starts to move . . . . . p. 278
Coal—Mechanization proves to be a mixed blessing . . . . . p. 279
Scrap—Drought turns to plenty . . . . . p. 280
Refractories—Synthetics gain popularity . . . . . p. 281
Metals & Alloys—Conservation is the key . . . . . p. 282

PRODUCTION PROCESSES

Metal Finishing—Research on new methods pays off . . . . . p. 286
Materials Handling—Makes automatic factory possible . . . . . p. 289
Machining—Higher speeds lower costs, up production . . . . . p. 290
Heat Treating—Mechanization of all phases coming . . . . . p. 293
Automation—Requires fewer but higher skilled men . . . . . p. 294
Melting—Vacuum methods extended, includes steels . . . . . p. 297
Casting—Shell molding passes shakedown tests . . . . . p. 298
Stamping & Forming—Mechanical robots take over . . . . . p. 300
Forging—Complete automation a reality . . . . . p. 301
Extrusion—Vital to "Chipless Production" . . . . . p. 302
Welding—Inert atmosphere use mushrooms . . . . . p. 303
Quality Control—Adopted by small shops too . . . . . p. 304
Testing & Inspection—Ultrasonic methods go on TV . . . . . p. 305

Analysis of population composition by age in many lines. Their debuts were postponed

BUSINESS Review Forecast ROUNDUP

Market in '53 should be strong . . . Defense spending will hit peak . . . Meet expansion goals . . . Speed up decontrol . . . Buyers' market shows heavy demand for new civilian goods.

◆ AMERICAN BUSINESS can expect a strong market in 1953. The sales pie should be plumper than ever. But it will be a competitive market, with the civilian starting to overshadow the government as the big customer by a wider margin. Continuing cost increases will step up the pressure on high sales, efficient operation. Controls should come off as materials ease.

Office of Defense Mobilization hasn't yet officially predicted the peak of defense spending, but it is expected about June. Since Korea roughly $128 billion has been appropriated for defense purposes. Of this, $106 billion has been slated for military hard goods—planes, tanks, guns, etc.—and $12 billion for soft goods. Defense and related construction has been scheduled for $10 billion.

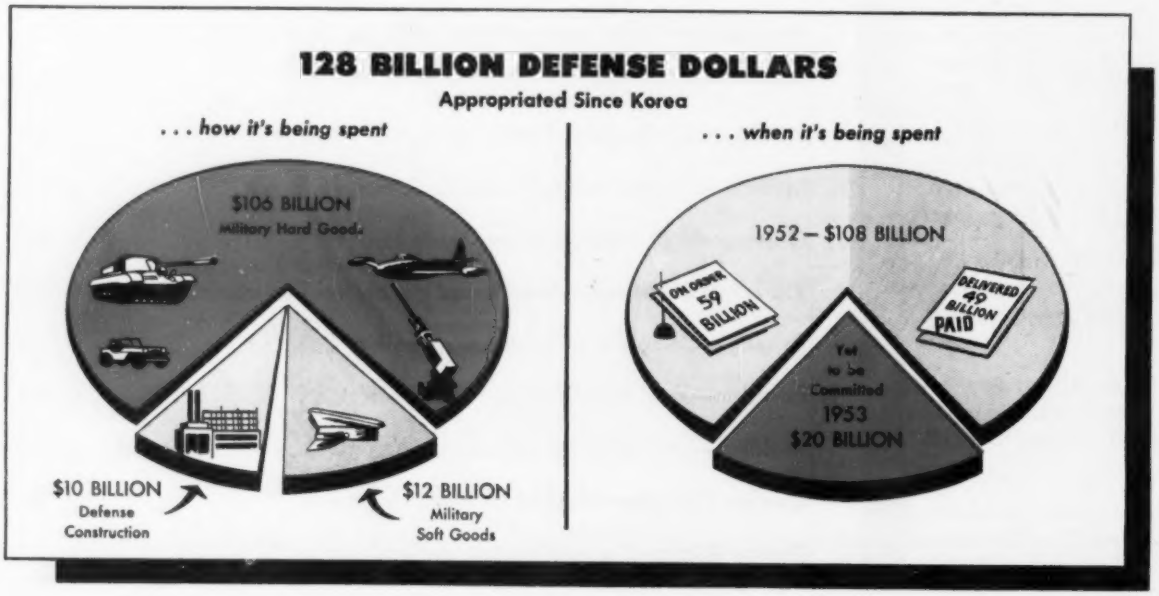
About $108 billion was committed in 1952. This leaves $20 billion to be spent during first half 1953. Of orders already placed, over $49 billion has been delivered, leaving just under $59 billion still on order and in process of manufacture. In other words, defense will account for about $79 billion worth of business in the first 6 months of this year. Thereafter it will level off and continue at a slightly lower rate for about 2 more years, excluding all-out war.

Washington unofficially says the new Administration can't do much to curb spending except for double-checking against waste. Hard and fast defense and foreign commitments indicate that rearmament production will carry through to its planned climax. Some savings, however minor, will probably evolve through wiser defense spending.

New industrial facilities will also be largely in place by mid-1953. Expansion went forward at record-breaking speed in 1952, but began to taper off in the final quarter. Total investment in new plant and equipment in 1952 was over $27 billion. Of those projects granted fast tax writeoffs before July 1, 1952, over 48 pct were completed by Dec. 31. And approval of applications for new projects fell off drastically in the last two quarters. But industry will not noticeably cut spending until June.

Expansion goals have been set for most of the important materials and products as well as adequate tax provisions to meet those goals. Existing goals may well be revised, and new ones planned. But it would be unwise to expect any large amount of business to derive from supplying new expansion after mid-year. Companies selling primarily to industry should plan for the future principally in terms of their customers' sales, not expansion.

In any event, industry will have to look to the civilian market for a bigger part of its future business. There shouldn't be any lack of customers. U. S. population today is over 150 million. By 1960 it should hit 174 million.



Analysis of population composition by age groups is revealing. World War II and the immediate postwar years boosted numbers of the nursery set (0 to 5 yr) from 13.2 million in 1940 to 19.8 million in 1950. A slight decline is predicted for the next 10 yr, giving a total of 17.3 million by 1960.

The 6 to 17-yr group showed little numerical growth in the past decade, but is expected to spurt from 28.9 million to 43.5 million by 1960. Their parents, the 18 to 59 bracket, rose from 77.6 million in '40 to 85.6 million in '50 and should hit 90.5 million in the next 10 yr.

The elder group, 60 and over, has shown phenomenal gains: 13.7 million in 1940, 17.4 million in 1950, an estimated 22.5 million by '60.

Customers will live longer, buy more

Not only will there be more customers, but more long-lived consumers will be buying for a longer time. Many more schools and homes must be built and equipped. Appliance demand is sure to be heavy. The large number of young people assures a strong automotive demand.

Growth of the elder group points to a broadening section of the market. As yet only few businesses have made a strong play directly for this segment. New techniques may have to be developed to serve it adequately.

The growing civilian market will need more goods and services. It will be able to pay for them. Personal income is at an all-time high. Savings are at a record $283 billion. Taxes and the living cost make easy credit desirable, but the consumer is still prosperous. A much-expanded industry is available to serve him.

New products and new designs will be of first importance. A lot of brave new products failed to materialize after World War II as manufacturers went for a pent-up market with slicked-up versions of the same old goods. The really new products and designs the customer has been hearing about just haven't appeared in many lines. Their debuts were postponed first by a too-hot postwar demand and then by risky metals and materials situations.

Sales and service have taken a lambasting in the last 10 years. With the return to a buyers' market, they'll assume more importance. Many younger salesmen, executives have never known a really competitive market. They'll have to be retrained in the techniques of the "hard sell." And management will have to take a searching look at its advertising, and, where applicable, packaging and other extras.

A further decrease in the work week is also in the cards, probably going somewhat under the present average of about 40 hr by 1960. More leisure will mean increased demand for goods and services. It will simultaneously stress the need for higher productivity to keep prices competitive. Plants and equipment must be overhauled, and new methods introduced.

The past year was marked by a generally improving supply of most metals as expansion programs and procurement policies took hold.

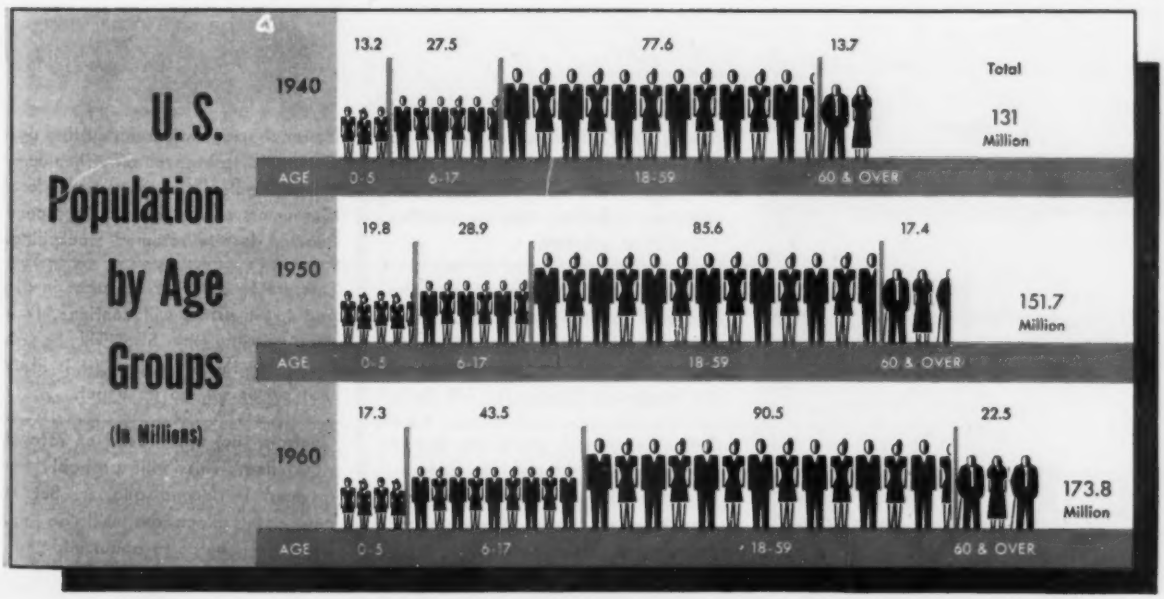
Strike delays steel market balance

The steel market, which was rapidly approaching balance earlier in 1952, was dealt a severe setback by a 54-day strike in June and July. This big strike was preceded by several fitful starts and stops that further complicated production and maintenance of the industry.

THE IRON AGE estimated more than 19 million tons of steel were lost in the strike.

Partly offsetting this loss was a large increase in capacity—from 108.6 million net tons on Jan. 1, 1952 to very close to 16 million net tons a year later. By the end of this year capacity is expected to be about 120 million tons (it passed the 100 million mark in 1950).

Production in 1953 totalled approximately 93.3 million net tons of ingots, compared with 105.1 million tons in 1951. Output for 1952 yielded about 68.9 million tons of finished steel



Steel demand, supply should be in fair balance by July, but certain items will stay in tight supply.

as contrasted with 78.9 million tons in 1951.

In late 1952 steel production was at an annual rate of about 116 million net tons, more than enough for military and civilian needs combined. The shortage continued because (1) defense and civilian demands continued to chew up large tonnages, (2) strike-depleted inventories and pipelines had to be replenished, and (3) loss of 19 million tons of production was equivalent to raising demand by that amount.

Outlook for steel demand and supply is reaching reasonable balance on most products during the second quarter. Some products, principally oil country goods, heavy plates and structurals, and large bars, will probably remain in tight supply for a while after most products have eased.

Aluminum production in 1952 totaled a little over 900,000 net tons. It would have gone over the million mark had it not been for power restrictions resulting from drought in the Pacific Northwest and Tennessee Valley.

Despite this handicap, supply and demand should be brought into balance during the second quarter of this year. Availability for civilian uses will depend largely on how much of the metal is relegated to the strategic stockpile. Stockpiling, much discussed but little achieved, will likely be resumed during the second quarter.

Our copper position should improve. During the first half of 1952 a domestic price ceiling well below free market world prices caused imports to sag badly.

After much of the red metal had gone elsewhere the government finally freed import prices in June. It allowed domestic users to pass through to customers 80 pct of the amount paid for imported copper above domestic ceiling prices. Stocks are now reasonably good.

This solution works a hardship on some American companies. The price differential is disadvantageous to American producers. And the 80 pct limit on cost pass-through of foreign copper keeps a profit squeeze on U. S. brass mills.

If price controls continue, it seems likely some increase in domestic prices will be allowed to reduce the price differential.

The nickel situation is bad, but improving. Nickel is expected to remain in short supply, despite more Canadian output and additional help from Nicaro. Voluntary allocation will likely continue after curbs have been lifted.

The importance of government controls cannot be over-emphasized in any review of the economy during 1952, or in any forecast of what to expect next year. Controls are the one market factor dominating all others during such periods.

There are few middle-of-the-roaders on controls. By and large, business men, government officials and economists can be divided into two groups. An outstanding steel executive who helped design the Controlled Materials Plan of World War II has been one of the most outspoken critics of the present CMP.

Controls relief should come soon

Greater availability of basic materials would have doomed most controls this year in any event (short of war). The new Administration in Washington is expected to speed the decontrol process.

Plans for orderly decontrol are already shaping up in Washington. First will come decontrol of civilian requirements. Industry will return to a free market, and producers and consumers will reestablish relationships as they gird to meet a buyers' market by mid-1953. Complete decontrol of military and atomic energy requirements will be deferred for some

THE OUTLOOK FOR THESE METALS
In terms of

	STEEL	ALUMINUM
SUPPLY	Supply and demand expected to reach balance about mid-year. After that ingot rate may decline moderately as industry capacity reaches 120 million net tons.	Power shortage will keep cutting output until spring run-off. Then production will climb as never before. Consumers should benefit in second quarter despite resumed stockpiling.
PRICE	Firm prices expected for at least the first half of the year. After that premium priced producers will probably have to meet competition of big producers. Conversion will fade.	Pressure for another 1¢ boost in pig and ingot prices will continue. It is very possible the hike will be allowed. At the same time, it is likely that prices will go up 5 pct.
CONTROLS	Easing of controls starts the first of the year. By mid-year the industry should be entirely free of controls, except for continuing directives and priority for direct defense.	Controls, too, will depend on rate of stockpiling. This will probably be resumed in second quarter. But in any case allocations will go up. Decontrol may come about mid-year.

time. Even when these controls are dropped industry will continue its pledge to meet all defense needs first.

One of the most significant and controversial events in metalworking — if not the entire economy — during 1952 was the steel strike. It was the longest and costliest in history. It lasted 54 days, costing each steelworker over $600 in lost pay, steel companies $100 million in lost profits, the government $210 million in lost taxes. The economy lost upwards of $4 billion.

Many in industry believe the strike could have been prevented, or at least held to short duration, if the government had kept hands off. Economic differences between the steel companies and the United Steel Workers of America were practically settled before the strike occurred. The big point of difference was union security, **or union shop.**

Final agreement was what had been expected all the time. The steelworkers had to settle for something that looks like a union shop but lacks the compulsory membership for which the union had held out for so long. New employees can choose whether or not they wish to join the union. Old employees have a chance to get out of the union if they don't like it.

The steelworkers also were granted a wage package totaling about 21.5¢ an hr per worker. This included a wage increase averaging 16¢ an hr. Fringe benefits accounted for an additional 5½¢ per hr. Substantially the same package had been offered before the strike.

Of course steel prices were raised to partly compensate for the higher costs. The increases averaged $5.20 a ton for carbon steel and 4.7 pct for other steel products.

The steel companies had opposed higher wages and prices, hoping to hold the line against further inflation. But recommendations of the Wage Stabilization Board, with full support of the Administration, made that impossible.

Metalworking and fabricating plants then faced a new round of labor demands. Almost disregarding their ability to pay, they were expected to match the record steel wage package. Metalworking plants have seldom been able to resist union demands based on the steel wage "pattern."

The furor resulting from mishandling of the steel case caused appointment of a new WSB with less authority. One of its first jobs was to review a coal wage agreement calling for a wage increase of $1.90 per day. The board refused to approve the entire increase but was overruled by President Truman. This resulted in the resignation of Chairman Archibald Cox and the industry members of the board.

The labor outlook for this year is for less interference from Washington and for real collective bargaining to return.

Are we in for a devaluation period?

The business outlook is extremely promising for at least the next 6 months. Perhaps activity will continue high for a good deal longer than that. For one thing, the economy appears to be moving on the third ascending business cycle since World War II.

What worries some economists is that we are now in our third business cycle without having gone through a period of devaluation or deflation (when the government takes in more money than it spends). We have had price testing and inventory correction, but we have not had deflation. There are still a number of economists who believe that in economics as in physics all that goes up must eventually come down. But they agree that the government can do more to forestall a sharp recession than previously, and that there probably isn't so much to be afraid of.

COPPER	LEAD	ZINC
Production of the red metal will also increase, but not to the spectacular rate of aluminum. But copper will still be tight. Better policies on copper may bring easing by fall.	Lead supplies should remain at the present more-than-adequate stage for some time to come. Continuation of present price levels will mean less production from marginal mines.	Like lead, supplies of zinc will remain on the abundant side despite the closing of some marginal sources due to lower prices. There will be more steel to galvanize in 1953.
A boost of perhaps 3¢ per lb to 27.5¢ for domestic copper may be granted in lieu of complete price freedom requested by industry. World price may settle near 30¢ per lb.	Domestic prices for this metal will fluctuate at about current levels according to the price on the London Metal Exchange, as they have since October when trading was freed.	The price, now at 12.5¢ per lb, will stay at about that level. Freeing of zinc for private trade in London on Jan. 2 will make the U. S. price dependent on that market's trends.
A copper market free of both price and distribution controls does not seem likely unless there is a major policy shift in Washington. Some relaxation, however, may be expected.	At present there are no controls on lead with the exception of a strictly academic price ceiling of 19¢ per lb and reporting provisions. These are small hindrances to the industry.	Again similar to lead, zinc controls are pretty much academic and are no bother to industry. The ceiling is 19.5¢ per lb at East St. Louis but price isn't likely to reach it.

METALS MATERIALS Review Forecast

Iron ore . . . Coal and coke . . . Scrap . . . Refractories . . . Metals and alloying agents: Titanium, aluminum coated steel.

IRON ORE

Overcoming 20-million ton strike deficit was the big job. Twelve new Lake vessels helped make the record haul . . .

◆ REPAIR crews are already swarming over Great Lakes ore vessels as the industry readies for the biggest hauling job in history. Mine operators and shippers have now pushed unpleasant memories of steel strike ore stoppages into the background. They are aiming at a goal of 100 million tons in 1953.

Industry sources believe Lakes vessels will have to transport that much ore to keep pace with production of an expanding steel industry which will have a 1953 capacity of 120 million tons.[1]

If shippers can maintain the terrific rate of the closing months of 1952, their present goal will be realized with something to spare. Brief survey of accelerated shipments following the strike should strengthen this year's predictions.

After transporting 89,092,012 gross tons in 1951, the industry hopefully set its sights on a 96 million ton goal last year.[2] But steelworkers and ore miners walked out in June. Up to that time 22,048,620 tons had been hauled. The 8-week strike which followed resulted in the loss of at least 20 million tons of ore.[3]

Since the big vessels moved out of shelter on July 28 they have set a torrid monthly pace. Record tonnages were hauled from Lake Head to steel centers in both August and September. Although unseasonable weather struck 2 weeks early in mid-October, performance was still better than usual.

Despite early freezing necessitating arduous steaming of ore, 9,294,947 tons were transported in November and 426,574 tons in December. Ordinarily Lake boats average 750,000 tons during the final month.

When the season ended early in December, steel consumers had received overall shipments totaling 74,910,798 tons and managed to stockpile an estimated 42 million tons for winter operations by Jan. 1.[4] This year's stockpile is higher than last year's, since consumers had 43,710,659 tons on hand on Jan. 1, 1952.

The big job couldn't have been done without additions to the fleet. In all, twelve new vessels were built from the keel up, including one self-unloader. Prime example of what newer vessels can be expected to accomplish is the case of the 714-ft *Joseph H. Thompson*, longest vessel on the Great Lakes. *Thompson* is the third longest ship in the U. S. merchant fleet (only luxury liners *United States* and *America* are longer) and can carry a pay load of 18,500 tons. It recently made a trip from Cleveland to Lake Head in 49 hr. Average time for older vessels is 78 hr.

This year shippers expect at least five new vessels to slide down the runways. Proposed construction coupled with improved loading and unloading facilities should enable shippers to satisfy steel's growing appetite for ore.

Iron ore men also hope the labor situation in ship and repair yards, always subject to heavy turnover, will be improved by Defense Transportation and Defense Mobilization priority ratings on employment. Preferential treatment should insure a well-conditioned fleet when the new shipping season opens next spring. Government aid will also provide an employment stopgap for Great Lakes sailors in danger of losing deferred draft status during the off-season.

Beneficiation and concentration programs are also accelerating and should contribute increasingly to the yield from ore ranges. Latest developments include:

Latest developments

1. DPA certification of a $300 million project undertaken by Erie Mining Co. (Bethlehem and Youngstown Sheet & Tube.)
2. Construction of 500,000 ton-per-year pilot plant by Oliver Mining Co. (U. S. Steel) which is scheduled to go into production early this year.
3. Construction of $75 million beneficiation plant at Beaver Bay, Minn., by Reserve Mining co. (Republic and Armco). Firm is also renovating pilot plant capable of producing 300,000 tons annually.

• Will be revised.

The Iron Age References

1 "Metals: Good Supplies Forecast," June 5, p. 96.
2 "Ore: Steel Strike Cuts Shipments," June 12, p. 72.
3 "Iron Ore: Shippers Will Make It," Nov. 6, p. 109.
4 "Fleets Set 1952 Goal," Jan. 3, p. 212.
5 "Taconite: New Project Enters Race," Feb. 21, p. 57.

COAL

Industry is tooling up to recapture markets it lost to oil and gas. Mine mechanization has been a mixed blessing . . .

◆ IMAGINATION is at work in the coal industry. Revolutionary changes have been made; many more are in the works. Transportation of coal by pipeline is a reality. Although not yet applied commercially, for all intents and purposes it is here. Moving coal through a pipe will help to offset one of the industry's biggest disadvantages in competition with other fuels—high-cost transportation from mine to consumer.

The industry has other ideas to cut transportation costs. The overland belt conveyer is one; combination water-overland shipping is another. The longest *permanent* coal conveyer is scheduled for completion by mid-1953. It will haul coal from a strip mine cleaning plant slightly more than five miles to a new power plant of the Ohio Power Co. at Beverly, Ohio. Consisting of a series of 36-in. rubber belts, the conveyer will move coal at the rate of 800 tons per hr at 600 fpm. Approximately 2200 tons of fabricated steel will go into the belt conveyer.

Mechanization and progress in the coal industry go hand-in-hand. Mechanical extraction and handling of coal has grown steadily.

In the near future, millions of tons of coal will be moved annually by pipeline. As a starter, Pittsburgh-Consolidation Coal Co. engineers visualize a 150-mile line from Cadiz, Ohio, to Cleveland. In its demonstration line at Cadiz, Pittsburgh-Consolidation is moving 7000 to 9000 tons of coal daily through a 3-mile-long system. In operation since November 1951, the 12¾-in. line has given engineers just about all the data they need to detail a commercial size system.

The industry's swing to mechanization has been swift. In 1935, mechanically-mined coal accounted for only 13.5 pct of total output in the U. S. Today, approximately 70 pct is mechanically handled. During the same period machine-cutting has risen from 84.2 pct to about 92 pct.

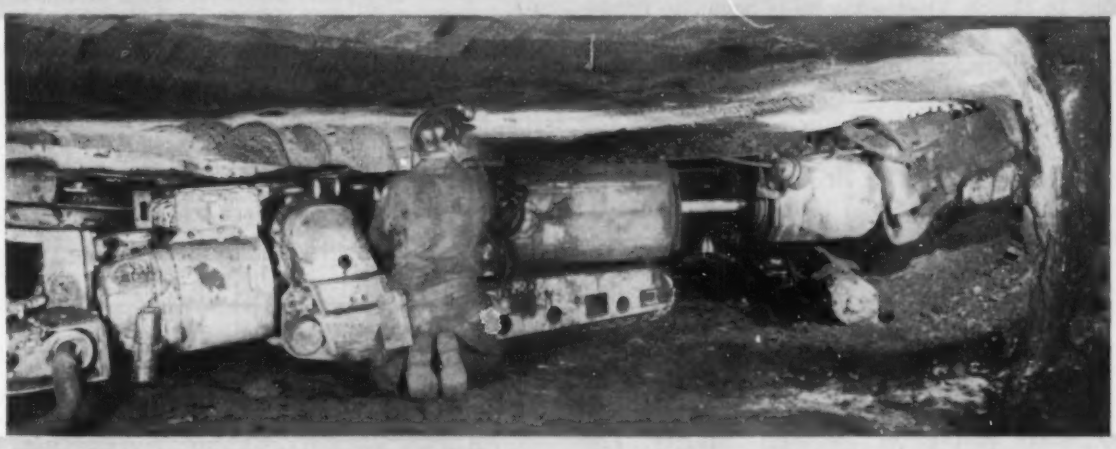
Output per man-day has kept pace. In 1935, the average for all mines was 4.50 tons. By 1951 this had risen to slightly more than seven tons. Productivity of both strip mines and deep mines increased. Strip mine output rose from 12.01 tons per man-day in 1935 to over 16 tons in 1951. Deep mine productivity increased from 4.32 tons to approximately six tons during the same period.

The advent of larger and more powerful shovels contributed greatly to increased output of the nation's strip mines. These monsters, as large as 55-cu yd, will strip an overburden of as much as 60 ft. Strip mines today account for approximately 25 pct of total output as compared with 6.4 pct in 1935.

Tough sledding ahead

Mine mechanization has not been an unmixed blessing. Machines are not selective. They mine the rock, slate, and dirt along with the coal. Because they are so indiscriminate, coal cleaning plants dot the landscape in most coal fields. Over 50 pct of today's mines have cleaning plants as compared with only 23 pct in 1935. About 40 pct of current production is mechanically cleaned against 12.2 pct in 1935.

From a competitive standpoint, the industry looks for tough sledding in the near future. Use of oil and natural gas in the U. S. has captured former coal markets. But petroleum production in the U. S. is expected by some authorities to hit a peak by 1960. As petroleum production declines, coal will make up the difference.



CONTINUOUS MINER, still in development stage, when coupled with improvements in coal mine transportation and roof support is eventually expected to nearly double mine productivity. Courtesy Joy Mfg. Co.

SCRAP

Capacity of collection and processing facilities has been expanded to meet 120-million ton steel capacity . . .

◆ SCRAP FAMINE experienced early last year rose to relative plenty by March. In the early winter months what averted mass shutdown of steelmaking furnaces was shuttling of scrap carloads from one area to another. This was done through the allocations network engineered by National Production Authority.

Scrap stockpiles of steel mills were down to the bare ground and frequently a shipment still on the tracks was relied upon to continue melting. Larger mills with huge demands suffered most and one major mill borrowed scrap from its fellows. Nevertheless the shortage forced a shutdown of eight of its furnaces.

This was one of the scrap industry's greatest challenges. That only eight furnaces were shut down during this starvation period is tribute to the industry's success. Bonus scrap came from auto graveyards under an NPA order to turn over inventory. A nationwide campaign went digging into industry's attic to get out dormant heavy scrap.

Shortage ended in March

In late February scrap sources began to thaw out. This was a period of scarcity oddly comfortable when compared to the near panic of weeks before. Cast iron scrap grades which had gone through the early months at ceiling prices began to weaken. In some districts many of these slipped below ceiling and did not recover for the rest of the year.

Signal that the scrap shortage was truly over came in March when some mills began to refuse allocations. Freight runs involved were sometimes too long and thus too costly. Stockpiles all over the country began to add substantial heft. And in Pittsburgh they climbed to 7 days for larger mills to 30 and 40 days for smaller ones. In Cleveland stockpiles stood at from 10 to 20 days; Detroit, from 10 to 15 days; and Chicago, from 7 to 15 days.

Blast furnace grades began to sag in March. Scrap was pouring into the mills and inspection became more rigid. Much of this heavy shipping was inspired by fears of an imminent steel strike. The scrap trade was on tenterhooks. It realized that it would be a full-fledged, although unwilling strike partner of the steel industry. The dormant scrap campaign began to die and allocations lost their range and urgency.

In May blast furnace scrap slipped officially below ceiling prices and demand was apathetic. Cleveland recorded the first below-ceiling sales and was followed by Chicago and Detroit.

The Supreme Court decision against Presidential seizure of the industry and the subsequent steel strike in June put scrap to sleep for 54 days. The loss of 19 million tons of steel was irretrievable and it caused a sales loss to the scrap industry of about 4.5 million gross tons.

Later in June some dealers were forced into desperation sales. The market on steelmaking grades submerged much below ceilings. Buying by the new Fairless Works strengthened open-hearth grades in the East. Fairless Works bought No. 2 heavy melting and bundles at $38 per ton, delivered.

In a spirit of bullishness after the strike, the scrap market returned to ceiling on most grades except turnings and cast. A prop for the post-strike market were old orders being filled at ceiling prices. The steel industry bought on a firm and steady basis and its stockpiles rose to mountainous proportions. Early in September mills were making certain that scrap quality was up to specifications.

Meanwhile scrap collections on the dealer level began to get skimpy. Many yards reported bare cupboards but a cushion against this was large inventory held by mills. Cast grades of scrap remained lifeless and small tonnages moved sporadically. Buying interest on all grades was erratic and in some districts electric furnace grades lost in popularity.

Last year the scrap industry added impressive size to its collection and processing plant. Despite the 54-day strike it is estimated that more than 30 million gross tons of scrap will have been shipped in '52. The scrap industry's capacity is several tons larger than this figure.

Scrap people predicting business volume of 1953 knew that an expanded steel industry would exert a respectable demand for metallics. Tonnage shipped should surpass 1952 by a few million tons. The scrap trade will be serving a steel industry with a capacity of 120 million tons sometime this year. The fluctuation of the ingot operating rate will tell the story of scrap sales this year. There is not much genuine pessimism among scrap people over future sales.

REFRACTORIES

Output increased by 10 pct over last year. New synthetic and cast refractories will widen present markets . . .

◆ THE REFRACTORY INDUSTRY in 1952 kept pace with expansion efforts of the steel and other industries it serves. An expansion program which the industry started in 1951 was continued through 1952. Some new plants were built and many plant facilities were modernized and additions made.

New kilns provided for better firing schedules, higher temperatures and stepped-up production capacity. Installation of improved handling equipment helped to service production equipment more efficiently and expedite shipments.

Technical developments in the industry were as noteworthy as expansion. Last year, the Carborundum Co. developed a new synthetic refractory called Fiberfrax[1]. Its immediate use seems most likely for furnace and jet engine insulation although its potential in other fields is very promising.

Fiberfrax hold its properties at temperatures up to 2300°F, nor will it soften at temperatures up to 3000°F. It can be combined with critical asbestos for many thermal and electrical uses. It can also be bonded into panels to insulate against fire and heat. As a filter, it can improve gas and fume filtration or remove bacteria. Its inertness permits cleaning and reuse without loss of filtering efficiency.

Potential is fascinating

Studies of potential applications indicate its suitability for heavy-duty brake linings, as a strengthening agent in plastic laminates for radomes and body armor, high-temperature gasketing, vibration dampening and as a flame filter. Its light weight, 2 lb per cu ft, is especially advantageous.

Vibration tests indicate that its use as a furnace lining at a density of 6 lb per cu ft will not cause it to settle. Compared to high-quality refractory insulation brick, insulation tests show that Fiberfrax fiber can save in weight and improve furnace efficiency. Tests also show that 30 pct less electrical power is required to maintain furnace equilibrium at 2500°F when compared to use of high-quality cemented refractory insulating brick. Time to bring the furnace up to temperature is cut in half.

The construction of full-rammed bottoms in openhearths, a wartime expedient less than 10 years ago, is now accepted practice among steelmakers[2]. This type of bottom can be constructed in about four days less time than other types. Its refractory life is 10 pct greater and the contour is more uniform.

END SECTION of a furnace which has been fully rammed. Vertical surface is heavily scored to assure a good bond at the joint when the next section is rammed.

Proper mixing of a refractory is essential. This can be done by hand, conventional concrete mixer, or a multi-bladed horizontal batch mixer. Of the three methods, multi-blade mixing has speeded mixing to about 25 tons of mix per hr. Proper water addition is extremely important. Tempered mix is conveyed to the furnace in an unhampered flow.

Usual practice is to place and roughly level the mix to a 3 to 4 in. depth. At least three heavily lapped passes of the air rammers in each direction gives about a 40 pct reduction and good density. Successive layers are tested for hardness with a ball-pean hammer in a manner similar to testing metals with a hardness tester.

Late last year a novel type of refractory material was reported[3]. Cast refractories as a replacement for standard types of firebrick appear destined to wider application. The chief advantages of the new material are comparative freedom from spalling and longer furnace lining life. So far tests indicate that far less maintenance expense is involved with the new refractory as compared with conventional brick.

Cast refractories are received in dry form mixed with water and then just poured into place. The mix is allowed to set for 2 days and then fired for 72 hr after which the refractory is ready for high temperature use.

In 1953, the expansion program of the refractory industry will be completed. This should increase its production capacity by more than 10 pct. Some plants will have expanded their facilities by as much as 35 to 40 pct.

The Iron Age References

[1] "New Fiber Filters, Insulates—Stands Up At 2300°F," Aug. 21, p. 133.

[2] "Rammed Openhearth Bottoms Increased Production," June 5, p. 133.

[3] "Cast Refractories Replace Brick In Heating Furnaces," Dec. 18, p. 140.

Metals Forecast Materials

METALS & ALLOYS

Titanium captured imaginations but found the market illusive . . . Ferroalloy makers set record in new plant construction . . . New methods found to coat steel with aluminum . . . the stainless steel family grows . . .

◆ LAST YEAR was a hectic and exciting one in the field of alloying agents and other additives for both ferrous and nonferrous users. Rare earths and electrolytic manganese gained much popularity. Broken up silicon carbide grinding wheels were thrown into steel ladles as an aluminum substitute. Simultaneously others who preferred to cling more to tradition hung extruded aluminum bars in their ladles instead of throwing in shot aluminum. Not to be outdone, a large foundry tried table salt as a nodulizing agent to make ductile iron. It was pleasantly surprised.

Perhaps the best kept secret of last year is the new nodulizing material for making nodular graphitic, or ductile iron. The new material does not contain any strategic metal or alloys. Although the wraps are still on, it has been learned that one of the chief ingredients is table salt or NaCl.

The improved properties of magnesium with rare earth additions were well documented early last year.[1] About midyear one company started to make a proprietory analysis containing but 1 pct max iron. Formerly, up to 5 pct iron salts were about the best rare earth alloy that could be found. The low iron bearing rare earths will find wide use in nonferrous applications.

Rare earth uses grow

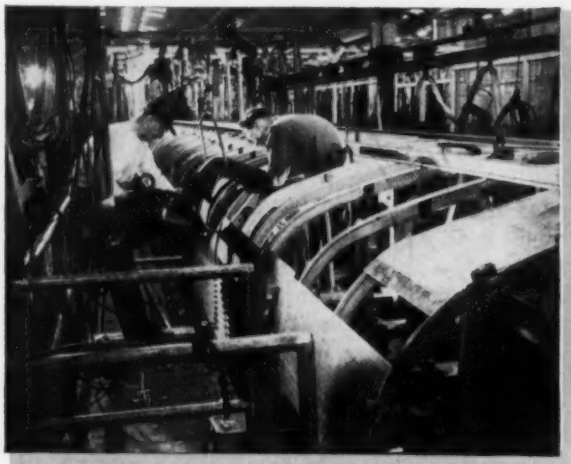
Tonnage use of rare earths in ferrous metals, started in 1951 by Carpenter Steel Co. for use in particular stainless grades, spread to the more common ferrous metals.[2] Rare earth additions to cast steel tank hulls, silicon strip, engineering alloys and more common stainless grades all were tested and some applications of rare earths to these metals are here to stay. By late fall the use of the rare earth oxides which had not proven too satisfactory before appeared ready for a comeback. If these rare earth compounds can be successfully introduced into the bath by tube blowing methods, they may give the other rare earth additives some stiff competition.

Silicon carbide as a deoxidizer has long been known. It took the threat of an aluminum shortage to cause some steel producers to swing from aluminum shot to silicon carbide. Substituted pound for pound this material, an abrasive, last year exceeded even the patent claim made for it around 1886. Arguments of whether pure silicon carbide or old broken up silicon carbide grinding wheels would do the best job haven't ended. However, it's no secret that the silicon carbide necessary to make a good wheel has to be top quality in every respect. It's quite logical to assume that silicon carbide sold loose may not be good enough to make wheels. This is purely a commercial matter but nevertheless interesting. At year's end, no one had proved how good a quality of silicon carbide is required to do the best deoxidization job in the ladle and not everybody could yet accept this unorthodox concept in quality steelmaking.

Aluminum as a deoxidizer can't be written off yet however. For a few years the steelmakers have been playing with solid extruded bars of aluminum suspended in the ladle as a deoxidation practice. One company has tested this method on aluminum-killed deep drawing steels and has reduced the aluminum required to fully kill a heat by 2 lb per ton. Surface rejects were also reduced by 75 pct and at press time none of the grinding wheel enthusiasts had topped this one.

Methods of making electrolytic manganese were perfected in 1940. Some men with foresight finally took the initiative and erected a plant to make this product.[3] Their acumen paid off when steel producers dusted off an old chromium-manganese type of austenitic stainless developed around 1930 by Union Carbide and Carbon Corp. This was reported on these pages in 1942.[4] The producers after finding type 430 stainless a poor substitute for 18-8 adopted a 1952 version containing 16 pct Cr, 16 pct Mn, 1 pct max Ni, 0.15 pct N_2 and 0.10 pct C.

By late 1952 metal fabricators were demanding more of this grade. But the steelmakers could not obtain enough electrolytic manganese to meet de-



NEW 16 PCT MN, 16 PCT CR austenitic stainless is being used by Budd Co. for railway passenger cars. The new grade called "TRC" has all the desirable fabricating characteristics of 18-8 without using over 1 pct Ni.

mand. Two new plants are under construction. They will increase production late this year by 21 million lb. This now firmly established new member of the stainless family requires the pure manganese because the amount of regular ferromanganese is restricted by the max carbon content. If prodded, the producers may use low carbon ferromanganese but pricewise the electrolytic is much more attractive.

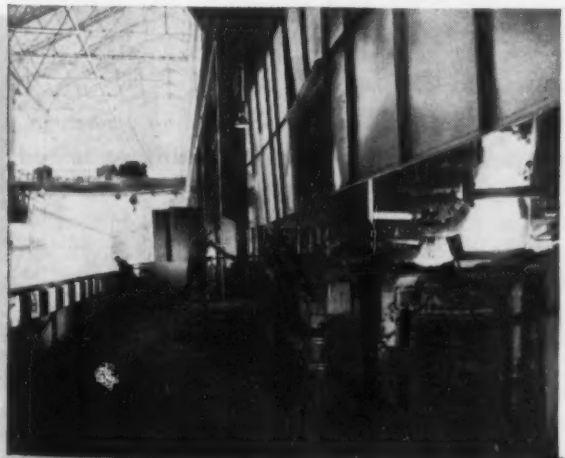
Some other significant developments were: low aluminum ferrotitanium versus scrap titanium to make type 321 stainless; the entry of two ferroalloy producers of pure silicon metal; and the plant being built to make new titanium master alloys. In the field of chromium, low-carbon ferrochromium held its popularity[5] as did chromium pellets which have now outmoded the chromite furnace bottom practice. Exothermic ferrochromium has replaced the use of high-carbon ferrochromium in most cases.

Metal shortages, either actual or threatening, strangely influenced metallurgical engineering last year. The drive for saving strategic metals produced leaner chemistries in some types of steel alloys.[6] These performed well. Other alloys were tried and sometimes found unsuitable because of poor fabricating and performance characteristics. The trial of 17 pct and 22 pct Cr stainless as a replacement for 18-8 to conserve nickel produced so many tribulations that the straight chromium grade was finally abandoned. The 16 pct Cr, 16 pct Mn, high nitrogen austenitic type of stainless now growing in popularity as an 18-8 replacement saves nickel but has created a temporary shortage of electrolytic manganese.

Manganese recovery gains

The importance of manganese to America has long been recognized. Work on lean ores continues and last year other facilities and methods were developed to help combat a possible manganese shortage in all-out war.[7]

Processes reclaiming highly strategic metals from wastes were further developed.[8] We will see more progress in the extracting of needed metals from lean ores and from waste or byproducts of regular metallurgical operations.



WORLD'S LARGEST ferroalloy plant at Marietta, Ohio, will be finished this year by Electro-Metallurgical Co. Principal products are: ferromanganese, ferrochromium and ferrosilicon.

The use of boron in constructional alloys in 1952 did not change materially from practices established in 1951. These grades have performed well and in cases outperformed some old richer alloys. However, it appears that the most important single factor in this substitution program is that the user must *want* to use them. Until and if more of the industry is forced to the boron grades, present production of between 65,000 to 70,000 tons per month will not change substantially.

Another dominant factor in last year's metallurgical development was growth of new nonferrous metals.[9] Titanium is first in the ranks and is destined some day to become a major metal in our economy. It wan't happen this year. The winner in the "Titanium Sweepstakes" can't yet be predicted. The odds are shifting constantly as researchers strive for less expensive recovery techniques.

Zirconium shows promise

Zirconium, second of tomorrow's metals may surge forward this year now that all the metal is not to be "secretly" consumed by AEC. Zirconium Metals Corp. of America, formed Oct. 1, will supply metal chiefly to the chemical industry. First industrial applications of zirconium in tonnage will be in seamless tubing. Although welded tubing can be used, extruded tubing is preferred as it is easier and faster fabricated. Zirconium offers more resistance to HCl than titanium and is almost as good as tantalum in this media. Small zirconium castings were made last year and tested as typewriter parts. New zirconium alloys for the electrical industry now under test may replace present metals in some applications requiring special resistivity characteristics.

This metal is about to enter the development stage of application similar to that experienced by titanium 2 years ago. Concerning the industrial growth of this metal a word of caution—zirconium will not get the all-out government support and subsidy accorded titanium.

Moly tried for jet engines

Molybdenum might be rated the third metal of tomorrow. Although a younger metal than titanium or zirconium various commercial applications have been made in the last few years. Early last year molybdenum metal was tried on jet engine parts.[10] The most useful material will eventually be found in molybdenum alloys. They are not yet developed but many are in the laboratory stage.

Keynote of 1952 in aluminum was expansion. Most spectacular of the new proposals was Aluminum Co. of America's Taiya Project for Alaska.[11] Plans call for two stages with annual capacities of 200,000 tons each, the first to be completed 4 years after construction begins.

Price fluctuations in nonferrous metals are expected to multiply. Some shortages will end.

Rugged, mountainous terrain dictated a design like Aluminum Co. of Canada's project.

At first a rapid easing in aluminum supply was anticipated. It didn't come about. With other materials appearing in worse shape, the light metal was pushed as a substitute or replacement for others, notably copper. The metal was readily adaptable for some applications. Some firms went on record as favoring aluminum even if copper availability improved.

Publicized for the first time in 1952 and put into commercial use is the dipping of fabricated steel parts in a molten aluminum bath. The process gives both heat and corrosion resistance to the parts.

Foil cladding and electroplating of steel with aluminum also came into greater prominence. Optimistic aluminum people expect these products to replace tinplate and galvanized steel in certain applications.

Harder, thicker and denser anodic coatings, with considerably better wear and abrasion resistance, were made available.[12] These hard oxide coatings on light-weight aluminum may well replace heavier metals for such items as gears, slides, pinions, pistons and many aircraft applications. Other materials such as chromium, tin, brass, copper and lead have also been coated on aluminum to give the metal outstanding characteristics.

Multiple pricing headache

The price of primary pig and ingot aluminum was advanced 1¢ to 19¢ and 20¢ per lb, respectively, while semi-finished and fabricated forms went up 5 pct. Industry wanted about double these increases but Office of Price Stabilization would go no higher. Pressure for higher prices continues.

Multiple pricing gave users of copper their biggest headache of the year.[13] Supplywise, elimination of the price ceiling on importation of copper was a boon, permitting greater use in 1952. But the arbitrary method used by OPS to set new brass mill product prices permitted many inequities to arise. Brass mills were required to obtain 60 pct of their needs from U. S. sources at 24.50¢ per lb, the rest at the world price of 36.50¢. They were allowed to pass through 80 pct of the increased costs which amounted to a price increase of 3.84¢ per lb.

Last year one company introduced a gas-free high-purity copper for electronic tube use. This metal contains less than 0.0108 pct total impurities. It is produced by melting and purifying electrolytic copper in a high-frequency induction furnace under a vacuum. Further processing is also done in a vacuum.

A new copper-nickel-silicon alloy developed by General Electric and Revere Copper & Brass showed high resistance to stress-corrosion failure. Critical amounts of iron added to the alloy gave improved properties. It has excellent properties in sand cast and hot-forged parts.

The past year has seen lead supplies rise from shortage to plenty. Descent of lead prices started from the 19¢ per lb ceiling late in April, then flattened out during the summer.

Freeing of lead on the London Metal Exchange started another skid in prices, bringing the metal to a low of 14¢ per lb at New York in October.

Storage battery manufacturers, biggest users of lead, were shifting to different grid alloys in aiming at greater capacity and longer life without increasing battery size. The newer alloys contain small quantities of copper, silver and sometimes tellurium to replace part of the antimony content of the grid metal. Better corrosion resistance results.

A major step forward was the replacement of older batch softening methods by a continuous softening and desilverizing process at one Mexican refinery. The new process was developed in Australia.

Magnesium into stockpile

Despite vastly increased demands placed on magnesium supply by rearmament, production swiftly outstripped requirements.[14] Supply-demand balance was reached in March though there was still a shortage of light-gage sheet. By the end of 1952 about 10,000 tons of the metal was being produced monthly by the Dow Chemical Co. and the six reactivated government standby plants. Output for the year hit an estimated 105,000 tons as compared to 40,914 tons in 1951. Civilian consumption was maintained at about 1000 tons monthly while military use grew to about 3000 tons a month. Surplus metal went into the national strategic stockpile.

Brooks and Perkins, Inc., finished its new Livonia Mill Div. last summer and started rolling plate and sheet at a rate of about 100 tons a month. Savings made by the modern setup permitted the company to reduce magnesium alloy plate prices 20 pct in November to 50c per lb in 3/16 in. and heavier thickness.

Magnesium with rare earth additions tested

British research in the field of adding rare earths to magnesium showed that addition of zinc to magnesium-zirconium-thorium alloys improved both creep and fatigue resistance at elevated temperatures. Zinc-thorium ratio was claimed to be the key.

Most important event of the year in tin was the nationalization of Bolivian mines, the only source of the metal in the Americas. Bolivia underwent a revolution early in the year and one of the first acts of the new government was announcement of coming tin nationalization. It took place in October. Before the revolt, Reconstruction Finance Corp. had after long negotia-

tion agreed to buy Bolivian tin at a delivered price of $1.21½. This was the same as in earlier agreements with Indonesia and Malaya.

The can-making industry is looking forward to dual plate in which one side of the steel sheet has heavier thickness of tin than the other. The strike-caused shortage of steel prevented the industry from extensively testing this material.

The tin shortage forced the use of blackplate for some types of containers and the can industry learned much about this product in 1952. Now that tin is available again a switch will be made back to 0.25-lb coatings—but not for all types of containers.

Like lead, zinc went from shortage to plenty during 1952. And the price trend was also similar. The 19.5¢ ceiling held until the beginning of the steel strike in June when the price plummetted to 13.5¢ in Aug. A mild recovery was made and then the East St. Louis quotation dropped to its bottom of 12.5¢ per lb.

Despite the announcement that zinc would be freed for trading on the London market early in 1953, general feeling in the trade turned stronger in October. The outlook was for higher, not lower prices.

Most interesting technical development of last year was New Jersey Zinc Co.'s Sterling process for smelting zinc.[15] A vertical furnace is used in which an electric arc carries on the reduction. Both zinc and pig iron are produced from an ore containing about 18 to 20 pct of each. Lead and cadmium collect in the zinc, copper and gold in the iron, and some silver is concentrated in each. Cerro de Pasco Copper Co. has been licensed to use this high-yield, low-cost method in Peru.

Powder metallurgy grows

Much attention was drawn by "man made" metals and metal-ceramic combinations during 1952. Powder metallurgy techniques are the basis of these materials. Chrome carbide,[16] one of the former, exhibits some unusual physical properties.

The new metal, composed of 83 pct chrome carbide, 2 pct tungsten carbide and 15 pct nickel, has high corrosion, erosion and abrasion resistance together with extreme resistance to high-temperature oxidation. The material may be molded or machined in the presintered stage.

One high-temperature metal ceramic developed was a hybrid incorporating molybdenum disilicide and suitable ceramic components. D-1922, as it is called, may be turned, drilled, filed and cut in the prefired condition and may be further worked after firing by grinding.

Iron powder parts came in for much development and testing work last year.[17] Ordnance Dept. ammunitiion programs moved ahead. Iron powder rotating bands are in production for hyper-velocity shells but general adoption for all types is not certain.

Experiments with .50 cal. steel cartridge cases drawn from sintered cups appear very favorable and complete 20 mm practice projectiles made from iron powder are on the way. Work is also being done with ball ammunition.

Supply of iron powder surpasses demand yet producers are expanding at a phenomenal rate. Their motive is to insure good supplies to manufacturers who may want to switch from other means of fabrication. One firm will soon bring into production a plant with an annual capacity of 28,000 tons. Some in the industry feel 50,000 tons a year would not be an oversupply by the end of 1953. This compares with a total U. S. supply of 15,600 tons in 1951, and about the same in 1952.

U. S. ALUMINUM CAPACITY
(Net Tons per Year)

	In Place Jan. 1, 1953	Under Construction	Total Projected
Aluminum Co. of America			
Alcoa, Tenn.	145,300		145,300
Badin, N. C.	43,350		43,350
Pt. Comfort, Tex.	92,000		92,000
Rockdale, Tex.	42,500	42,500	85,000
St. Lawrence, N. Y.	55,000		55,000
Massena, N. Y.	72,000		72,000
Vancouver, Wash.	76,100		76,100
Wenatchee, Wash.	85,000		85,000
TOTAL ALCOA	611,250	42,500	653,750
Anaconda Aluminum Co.			
Columbia Falls, Mont.		50,000	50,000
Kaiser Aluminum & Chemical Corp.			
Chalmette, La.	100,000	100,000	200,000
Mead, Wash.	175,000		175,000
Tacoma, Wash.	25,000	8,200	33,200
TOTAL KAISER	300,000	108,200	408,200
Reynolds Metals Co.			
Arkadelphia, Ark.		55,000	55,000
Corpus Christi, Tex.	80,000		80,000
Jones Mills, Ark.	97,000		97,000
Listerhill, Ala.	50,000		50,000
Longview, Wash.	50,000		50,000
Troutdale, Ore.	82,500		82,500
TOTAL REYNOLDS	359,500	55,000	414,500
Third Round Expansion			
Olin Industries, Inc.			110,000
Unapportioned			90,000
TOTAL UNITED STATES	1,270,750	255,700	1,726,450

The Iron Age References

[1] "Rare Earths Increase High Temperature Properties of Magnesium," Jan. 17, 1952, p. 102.

[2] "Rare Earths Improve Properties of Many Ferrous Metals," Apr. 24, 1952, Part I, p. 129. "Rare Earths Improve Properties of Many Ferrous Metals," May 1, 1952, Part II, p. 141.

[3] "Electrolytic Manganese Acceptance Grows," Sept. 18, 1952, p. 168.

[4] "High Manganese Austenitic Steels," Oct. 1, 1942, p. 51.

[5] "Low Carbon Ferro Chromium Cuts Stainless Ingot Costs," Feb. 21, 1952, p. 109.

[6] "Lower Alloys Developed For High Temperature Use," Feb. 21, 1952, p. 99.

[7] "Experimental Furnace Recovers Manganese From Slag," Feb. 28, 1952, p. 97.

[8] "Alnico Recovery Process Salvages Valuable Ni & Co," July 3, 1952, p. 115.

[9] "Metals For Tomorrow," Oct. 9, 1952, p. 259.

[10] "Jet Engines Push Welded Molybdenum Study," July 10, 1952, p. 145.

[11] "Aluminum: Next Frontier, Alaska," Aug. 28, 1952, p. 45.

[12] "Hard Aluminum Finishes Resist Wear, Abrasion," Oct. 30, 1952, p. 81.

[13] "More Confusion Added In Copper," Sept. 18, 1952, p. 198.

[14] "Magnesium: Stock Huge Surplus," Nov. 20, 1952, p. 76.

[15] "The Sterling Process," Journal Of Metals, June, 1952, p. 581.

[16] "Chrome Carbide Has Unusual Physical Properties," Aug. 14, 1952, p. 129.

[17] "Iron Powder: Use Grows, Output Spurts," Oct. 2, 1952, p. 37.

PRODUCTION Review Forecast PROCESSES

Metal finishing . . Materials handling . . Machining . . Heat treating . . Automation . . Melting . . Casting . . Stamping . . Forging . . Extrusion . . Welding . . Quality control . . Testing

METAL FINISHING

Coating by vapor deposition enjoys a revival. Hot-dip aluminum coating techniques perfected. Brass saves nickel . . .

◆ CONTINUING shortages of strategic metals in 1952's quasi-war period and their companion, NPA restrictions on use, sent the metal finishing industry to the laboratory to discover or readopt substitute finishing materials and new processes. Meanwhile procurement of shortage metals took on the urgency of survival and other perplexing commercial problems had to be licked.

The search for new techniques in coating led to the revival of vapor deposition[1]—invented and given up 50 years ago. It was first tried in forming tungsten filaments for incandescent lights but was not commercially accepted.

Vapor deposition is defined as the formation of a coating by chemical reaction at a heated surface in vacuum. A metal coating may be applied by passing a volatile metal chloride and hydrogen over a heated underbody. Since the temperature need only to be high enough for a reasonable reaction rate, deposition may be carried out far below the melting point of the material. Tantalum, with a melting point of 3000°C, can be deposited at 500° to 600°C. Coatings are dense and have the same properties as fused metals of comparable purity.

The method is flexible and versatile. It can be used to form a wide variety of refractory coatings such as carbides, nitrides, silicides and oxides. Most of these can be applied at atmospheric pressure. In some cases, a reduced pressure is advantageous but the technique is somewhat more involved.

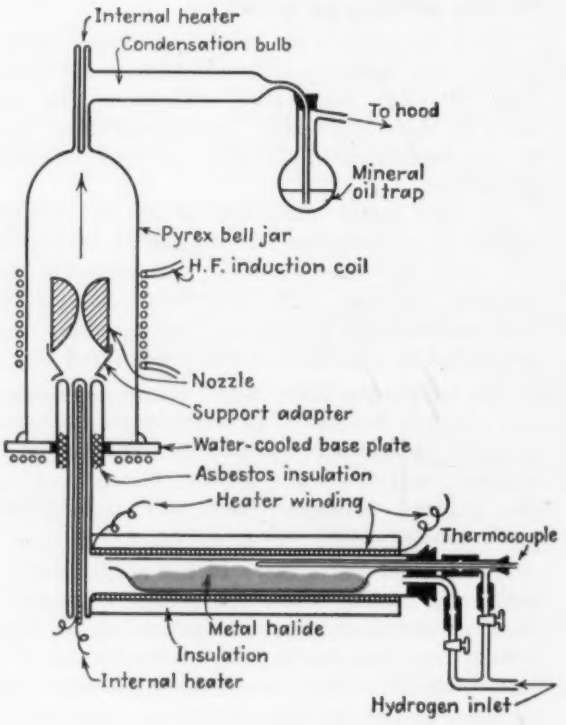
In this coating procedure, plating atmosphere is forced past the heated underbody. A carrier gas, inert to transport certain substances and reactive for others, is frequently used. Internal heating of the specimen by induction or resistance heating is best.

Metals can be deposited in ductile form except osmium, ruthenium and probably iridium. They can be made hard and brittle by adding traces of carbon, oxygen, nitrogen or hydrogen compounds to the atmosphere. The carbides, nitrides, borides, silicides, oxides, boron and silicon are hard and brittle except for tantalum silicide and to some extent molybdenum silicide.

Deposition rates vary with the material deposited and the method used. Certain metals build up at 7.5 to 65 microns per min. Thickness of deposits may also vary from a few hundred-thousandths to several thousandths of an inch but the average is from 0.0001 to 0.005 in.

Many products and materials have been coated by vapor deposition. Adherent nonporous deposits have been formed by many metals, carbides, nitrides, borides, silicides and oxides. Metals have been coated on nonmetals and vice versa.

Bright white brass plating was widely used and discussed during the past year because of



COATING NOZZLES by vapor deposition with laboratory equipment. Heat is applied by an induction coil.

its value in conserving the nickel supply. White brass plating was done by DuPont as early as 1939 using a 72 pct Zn, 28 pct Cu mixture in a cyanide bath. The finish was dull but with buffing and chromium plating, its appearance was equal to a bright nickel finish. Because the finish was brittle, the process died a natural death commercially. The present process overcomes some previous disadvantages.

Present white brass plating techniques use high purity anodes containing 20 pct Cu and 80 pct Zn. Separate anodes of Cu and Zn are sometimes used. The alkali cyanide bath will produce a white brass finish in 12 min maximum. Temperature of the bath ranges from 60° to 80°F. Anode efficiency is about 90 pct and anode current densities for bright coatings are from 10 to 40 amp per sq ft.

Chromium plating over the white brass is done in a chromic-sulfuric acid bath. Dull and bright white brass coatings will crack if held at 350°F for 1 hr. Low ductility and internal stresses are characteristic of this coating. A change to white brass is not difficult.

More automatic plating

Some of the plating problems encountered in unit output and floor planning in a bright dip installation are being solved by the use of automatic plating equipment.[2] A fully automatic bright dip machine built by Frederic B. Stevens, Inc., takes small brass parts through a complete plating cycle. This includes double cleaning, rinse, acid pickle to remove scale, rinse, bright dip, rinse, chromate treatment, rinse and hot rinse. With minor changes, parts can be dried after treatment.

One firm making auto and bicycle assemblies found that mechanical handling in cleaning and painting processes results in better and more durable finishes.[3]

Aluminum process introduced

A phosphoric acid surface treatment, called the Nielizing process, has proven itself a very effective pre-paint conditioner.[4] One firm, manufacturing equipment constantly exposed to moisture, had no rejects for a faulty paint job in more than five years of volume production. The work is normally held in a 180°F bath for 2 to 3 min to remove soil, rust and light oil.

The acid bath is initially charged with 75 gal of liquid Nielite 983 together with 325 gal of water. The bath is maintained at a pH of 7.8. After this treatment, zinc-coated parts are rinsed in 180°F water, air dried, paint sprayed and dried in an infra-red oven at 275°F. Uncoated mild steel parts are given an additional dip in a fixing solution containing 12 lb of a prepared fix to 400 gal of water. Only a 15 to 30 sec immersion is required.

This process not only cleans the part but deactivates the surface against corrosion. Finished products have withstood atmospheric corrosion for 2 years. The average cost of preparing metal parts averaged 0.032¢ per unit.

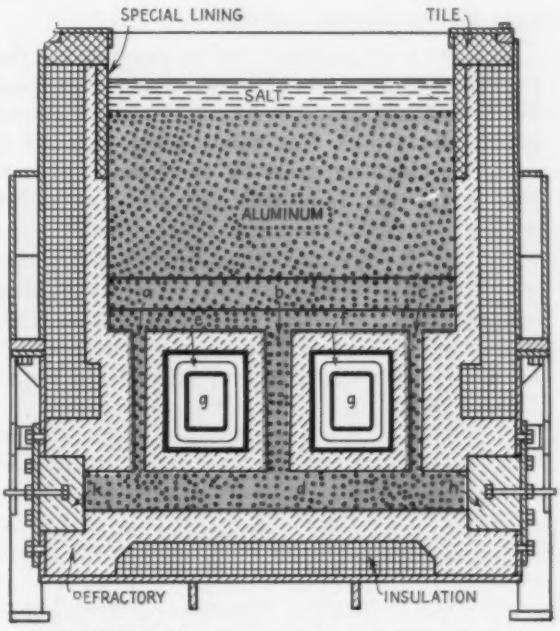
A new process for hot-dip coating complex-shaped steel parts with aluminum was developed by General Motors Corp.[5] Success of the process depended on a difficult refractory problem. Solving it would eliminate contamination of the bath. The furnace used by GM has an outer steel shell and a porous inner layer of special refractory brick. The salts permeate the brick network and provide a furnace lining of the same active salts used in the process.

Heat exchanger units are now being hot-dip coated in commercial quantities. Potential applications include truck, coach and car muffler shells and ends, muffler inner tubes, exhaust and tail pipes and others. Before hot-dipping, the heat exchanger passes through a cleaning cycle consisting of an alkaline cleaner, hot water rinse, an acid pickle, a cold water rinse, and another hot water rinse. After cleaning, parts are furnace dried.

Preheating is done in an immersed electrode bath containing preheating salt and about 2 to 2½ in. of aluminum at the bottom. Parts are immersed in the bath, which is held at a temperature of 1280° to 1400°F, for about 4 min. When properly preheated and fluxed, parts have a silvery sheen.

After preheating, the heat exchanger is immediately transferred to the aluminum dip. A ½-in. layer of salt flux of the same chemical composition as the preheating bath covers this bath. Normally, parts are held in the aluminum for ½ to 1 min but if a heavier coating is desired, immersion time of 4 to 6 min may be used.

Micrographic examination of the coating shows that two distinct layers are formed: iron-bearing aluminum on the outside and a layer



CROSS-SECTION of an induction furnace used for dipping. The aluminum acts as dead-shorted secondary circuits. Induction heating agitates the aluminum.

Shot blast cleaning getting more attention. Electrostatic painting gains. Nickel supply growing.

of iron-aluminum alloys between the outer layer and the steel. Resistance to heat and corrosion is made possible by this layer of aluminum-iron alloy.

A hard, zinc-containing coating has replaced cadmium for protecting 75 exposed metal parts on truck trailers.[6] The coating is impervious to road salt, mud and other corrosive agents. Adequate protection is provided by a single coating. Since it adheres well, the coating is practically chip-proof. It can be applied by spray, brush or dipping equipment. The only pre-coating preparation is removal of dirt and scale with an alkaline cleaner.

Coated parts show no film failure after 1000 hr of standard ASTM salt spray exposure at 90°F with 20 pct solution. They are unaffected by marine conditions, mild acids, alkalis, hot water up to 150°F and air temperatures up to 600°F. They resist gasoline, salt water, oils and greases. Resistance to abrasion is excellent.

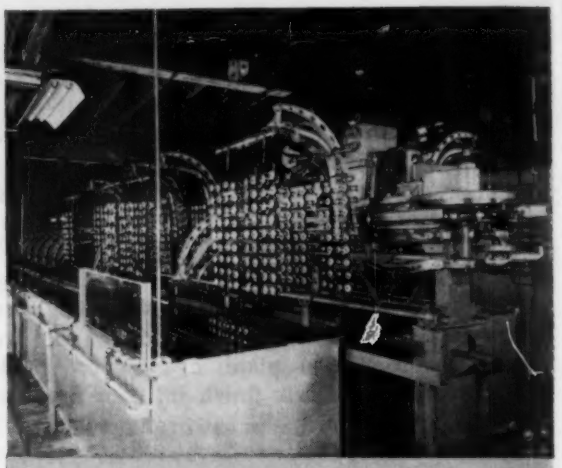
A new caustic etching compound for treating aluminum eliminates the need for frequent shutdowns to remove alumina sludge and scale from tanks.[7] The etching compound, Diversey Aluminux, contains an agent which prevents formation of alumina sludge and scale by holding sodium aluminate in solution. Solutions are clear without the usual suspended matter characteristic of ordinary caustic materials. A 1000-gal solution can retain more than 1½ tons of dissolved solids.

Less sludge in new solution

Temperature of the solution depends on the results desired. Time of immersion varies from 30 sec to 5 min or more. At one General Electric plant, an 11-tank line takes parts through a complete cleaning cycle by overhead conveyer. Previously, the tank was recharged every 10 working days. Three to five men needed one working shift to remove the sludge. Some sludge was also removed at intervals. Now, recharging is done after 4 weeks at which time only a small amount of alumina, sludge and scale are present. Tank cleanup takes one man 1 hr to get rid of the deposit of inert alloying ingredients.

Shot blast cleaning is attracting more interest from management for certain types of production.[8] This may be due to either of two reasons: (1) the advantages it offers over pickling operations or (2) the mounting pressure of the waste pickle disposal problem.

Allegheny Ludlum Steel Corp. installed a short blasting unit in its continuous hot-rolled stainless strip pickling line which proved advantageous in several ways. Most important was



ONLY TWO MEN are needed to run this fully automatic plating machine. Each dipping and draining operation is accurately controlled from a central panel.

elimination of the scale-breaking operation on straight chrome grades. Another factor was the 50 pct saving in floor space as compared with the batch pickling operation previously used.

Electrostatic painting,[9] introduced in 1951, is rapidly changing painting methods in large production setups. Compared to conventional spray painting, electrostatic painting has three advantages: (1) it requires one third the floor space, (2) finishes more units per gal of paint, (3) produces more uniform coating and (4) reduces overall investment in equipment.

All of the coating material leaving the spray head is deposited on the article. Coverage is substantially greater and paint consumption is far less. The paint used is the same as for hand spraying. Since there is no over-spray, ventilation problems have been minimized.

In 1953, end-use controls on nickel may be eased before midyear. White brass coating for chromium finishes will be on its way out before that time in favor of other metals soon to be announced. Aluminum plating on steel[10] will make further inroads on galvanized and tinned finishes for some applications. The search for multi-purpose cleaners will be more vigorous and mechanical cleaning will be more prominent. Refinements will be made in electroplating techniques and materials but radical changes will not be made for the next few years.

The Iron Age References

[1] "Vapor Deposition May Solve Today's Coating Problems," Apr. 10, p. 113.
[2] "Automatic Acid Bright Dip Has Many Advantages," July 24, p. 109.
[3] "Mechanical Handling Simplifies Parts Finishing," July 3, p. 122.
[4] "Phosphoric Acid Treatment Improves Paint Adherence, Corrosion Resistance," July 17, p. 138.
[5] "Complex Parts Easily Coated With Aluminum," June 12, p. 115.
[6] "Zinc Protects Trailer Parts From Corrosion," May 29, p. 82.
[7] "Caustic Etch Treats Aluminum Without Sludge or Scale," Apr. 3, p. 138.
[8] "Shot Blasting Speeds Stainless Strip Cleaning," June 19, p. 133.
[9] "Get More Coverage With Electrostatic Painting," Aug. 7, p. 116.
[10] "Aluminum Electroplated On Steel From Fused Salt Bath," Jan. 17, p. 100.

MATERIALS HANDLING

Central control boards, group conveyers, automatic switching make automated plant possible. Small hoists improved . . .

◆ PLANNED MATERIALS HANDLING has been a primary source of manufacturing economies during the entire postwar period. Unit production cost savings in the case of vehicles ranging from $50 up to $100 have resulted directly or indirectly from more efficient materials handling methods. Equally impressive economies have been reported by other manufacturing industries.

Cost accountants who have looked searchingly at all of its ramifications agree that materials handling is the largest single item of manufacturing cost.

Efficient materials handling may take many forms. For example, transfer machines are being used to handle 4-ton armor plate.[1] Although a comparatively low unit production item, the savings resulting from automatic mechanical handling are substantial.

Another example: the use of a conveyer-lowerator for moving tinplate from the dock to basement storage has cut highway truck unloading time by 66 pct and permits one fork truck to do the work of two.[2]

Conveyer designs are better

Normally considered unsuitable for production line assembly, exhaust pipes for tank engines are being assembled on a 140 ft belt conveyer. The new method permits greater output in half the space previously used.[3]

Another form of sound materials handling that is sometimes ignored is packaging. One company is using molded foam rubber dunnage to protect jet engine spare power takeoff gear boxes. Standard shipping containers can now be used, special holding devices are eliminated and shock loads are evenly distributed.[4]

During the past year conveyer designs have been improved in many ways. The power and free conveyer has come into its own, building new flexibility into the system. Centralized control of the entire materials handling system has been successfully worked out. Automatic switching, particularly to shipping docks, has produced large savings for the appliance industry, for example.

A new "group" conveyer has been developed that makes it possible to vary the distance between objects suspended from the conveyer while running the conveyer at a constant rate.

Automatic packaging — including counting, closing, sealing and labeling have been employed increasingly in recent years. This trend is continuing. A typical new packaging unit is a power-driven strapping machine designed to speed up flat steel strapping operations and reduce operator fatigue. The new method produces strap joints by spot welding. (Acme Steel Co., Chicago. See Pix.) Even oddly shaped auto bumpers are being wrapped automatically.

Relatively unpublicized technical developments often result in important savings in materials handling costs. The small electric hoist has made great strides in recent years, featuring more speed, less operator effort, higher output. Motorized trolleys have been speeded up. Fast, reliable push-button controls have replaced pull ropes. All hoist motions can now be controlled with one hand. Loads can be spotted closer, faster and safer. The electrified chain hoist is making a comeback. The small sprocket size of recent designs is a factor here.

The latest materials handling boards bring control into the manager's office. The new centralized control method prevents unauthorized or incompetent operation, limits responsibility for starting or stopping production lines to one operator and facilitates trouble shooting.

Two-way radio communication is a topic of considerable interest among materials handling engineers. One major auto producer has tried a two-way radio on several tractors and a motorcycle with considerable success. The opportunities for using a two-way radio system will undoubtedly be thoroughly explored during 1953.

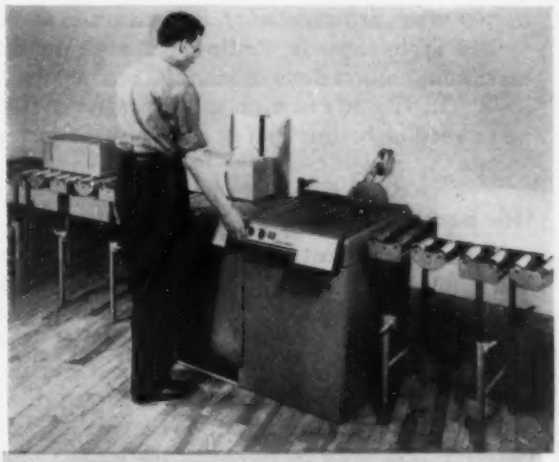
The Iron Age References

[1] "Transfer Machines Handle 4-ton Armor Plate Weldment," Oct. 2, p. 108.

[2] "Conveyer-lowerator Cuts Unloading Time 66 Pct," June 26, p. 110.

[3] "Good Materials Handling Permits More Output in Half the Space," June 12, p. 124.

[4] "Foam Rubber Dunnage Cushions Jet Engine Spares," Feb. 7, p. 150.



POWER-DRIVEN strapping machine speeds flat steel strapping operations and reduces operator fatigue.

MACHINING

Carbon dioxide coolants and electro - mechanical machining helped up productivity on some of the toughest jobs . . .

◆ HIGHER COSTS for labor and materials have pushed manufacturers to effecting cost reductions while at the same time shrinking the area in which this can be done. Because these two higher costs are comparatively inflexible a manufacturer must turn to the production process itself to make his prices more competitive. His goal is higher productivity.

High speed machining is expected to play an even greater part in reducing costs this year. Automatic loading and unloading of materials, faster and more economical chip disposal, and more effective coolants for machining new hard materials will become increasingly important.

High velocity saves machining time and also frequently improves surface finish. Furthermore, there seems to be less distortion below the surface. This means less stress set up in the part because of machining, and less trouble with distortion later, especially in heat treating.

High velocity setups cost more

Other factors must be weighed against these advantages. It usually costs more to set up for high velocity machining. These extra costs may not be justified if the savings in machining time are small in relation to cycle time.

Turning at speeds two or three time faster with carbides normally doesn't demand special machines or tools.[1] What is needed is adherence to sound tooling rules. In many cases, research has shown that parts machined formerly at 250 to 300 sfpm are capable of being turned at 500 to 600 sfpm. Speeds obtained in high velocity machining on various materials are shown in Table II. Tool life at high velocity will generally be as good or better than at conventional surface speeds.

Use carbides for heavy cuts

To reduce the cost of machining bearing races, one company turned to high speed machining.[2] Surface speeds used in cutting alloy steels such as SAE-52100 and 4620 were increased from 200 to 275 sfpm to over 600 sfpm on a standard make of automatic lathe. Horsepower was raised from 15 to 40. Tools such as boring, turning and chamfer bars were increased to the largest practical cross-section and heat treated for rigidity and resistance to chip erosion.

Heavy cuts at high velocity were most economically made using the hardest grade of carbide because of their crater resistance. Chip breaker design was studied since chip control and removal from the machine are important factors in cost reduction. It was found that varying the width of chip breakers had an affect on tool life.

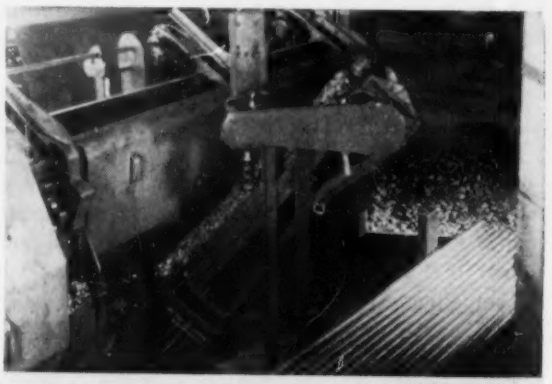
Along with the progress in faster material removal is the need for better material and chip handling.[3] This is particularly true in automatic equipment. On one automatic screw machine, 1700 lb of bar stock was loaded into the stock reel every 8 hr when high speed steel tools were used. With complete carbide tooling on the same job, 10 loadings totalling 1700 lb were required in the same period.

To meet this requirement complete automatic stock loading equipment was installed. Automatic loading was accomplished in one-quarter the time formerly taken by hand loading. Where an operator had been handling 1800 lb of material to produce a gross of 320 pieces, he now handles no material and produces 1920 pieces. Chip removal equipment, shown below, was installed with equally beneficial results.

Carbon dioxide helps on titanium

Use of liquid carbon dioxide as a coolant assumed greater status last year and interest in this cooling medium is expected to increase with further experimentation. While one of its most successful applications has been in the grinding of carbide tools, it also offers great promise in turning, milling, boring, drilling, tapping and broaching hard materials.

Joint Navy-Westinghouse research on the machining of titanium last year lead to recommending the use of CO_2 wherever possible.[4] Titanium alloy will adhere to tool steel, high speed steel and even carbide to a high degree. In these tests, about 250 cu in. of metal was removed from a large diam disk of high carbon titanium alloy at 160 sfpm, 0.023 ipr feed and ¼ in. depth of cut, using CO_2 coolant. Examina-



CHIP CONVEYER here permits faster and better chip handling which is required by faster removal of material due to tooling with carbides.

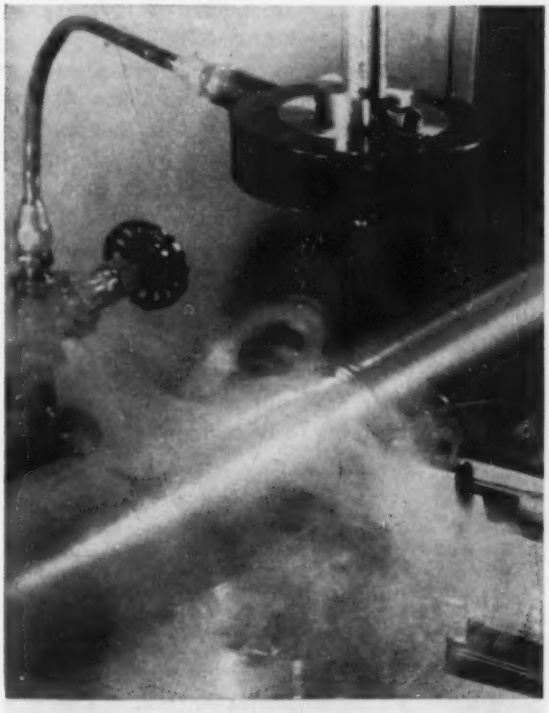
tion of the tool tip revealed only about 0.010 in. land wear and no burning and build-up.

Extensive tests showed many advantages from use of CO_2 as a coolant in grinding carbide tools.[5] One test showed that longer grinding wheel life was obtainable when 11 wheel dressings were required with conventional coolant compared to one when CO_2 was used. Similiar results were obtained in grinding carbides by another company. To eliminate individual CO_2 units at each point, a central storage tank was installed from which a high pressure pump feeds pipelines carrying CO_2 to points of use.[6]

A new method of oil lubrication and cooling of machining operations also achieved prominence last year. The Hi-Jet process consists of directing small high speed jets of oil from below the cutting tool.[7] Increases in tool life up to 500 pct have been found in tests with carbide tools and up to 1200 pct with high speed steel tools.

Tests indicate that much of the oil actually passes through the tool edge and the work, probably as a vapor as shown below.

The shortage of diamond bort has spurred conservation efforts and the development of new processes for reducing or eliminating use of diamond wheels in grinding cemented carbides. This year the defense effort will require more cemented carbide grinding than during the peak years of World War II. However, it is expected that imports during 1953 will reach only two-thirds those of the war years.[8]



TURNING, using a new method of supplying coolant produces much smoke and vapor, indicating coolant is reaching the cutting edge.

Since sharpening single point carbide tools accounts for the greatest consumption of diamond bort, research has been mostly concentrated on the development of alternatives to diamond grinding.

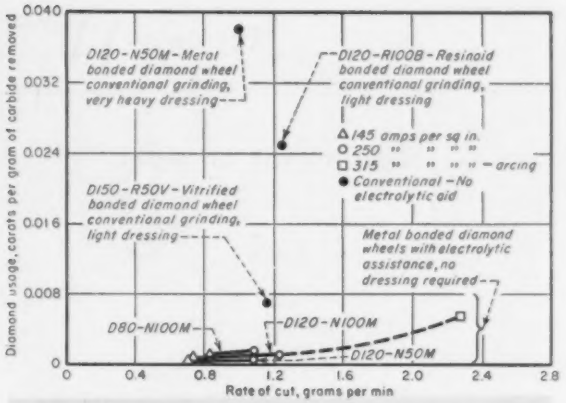
Four new processes for grinding carbides have been developed. These are the electrolytic, electro-sparking, electro-arcing and ultrasonic processes. Singly or in combination they eliminate the need for diamond grinding in some cases and materially reduce wheel consumption in others.[9] Eight applications where these new processes may prove highly desirable include: sharpening single point tools, grinding single point chip breakers, sharpening milling cutters and broaches, grinding projectile cores, shaping and finishing dies, forming turbine bucket root sections, rifling gun barrels and machining and grinding turbine compressor disks.

Electrolytic grinding saves diamonds

In the electrolytic process the grinding wheel can be simply a metal disk, rotated very close to the workpiece but not touching it. An electrolytic cell is formed with the wheel as the cathode, the work as the anode, and an electrolyte supplied in the same manner as coolant now applied in grinding. The process seems especially suited for removing stock from large surface areas.

Tests on the use of electrolytic grinding to assist conventional diamond wheel grinding have shown it promising as a commercial method of sharpening single-point carbide tools.[10] Commercially accepted rates of cut, as compared with vitrified bonded wheels in conventional grinding, can be maintained with a diamond consumption only a fraction of that for conventional grinding. Rates of cut and diamond usage are both extremely important factors. The chart below relates diamond usage and rate of cut for many of the wheels employed in the tests.

With electrolytic assistance of 250 amps per sq in. three metal bonded diamond wheels cut



DIAMOND USAGE v. rate of cut, conventional v. electrolytically-assisted diamond wheel grinding. Conditions: 70 psi; wheel speed 4000 sfpm.

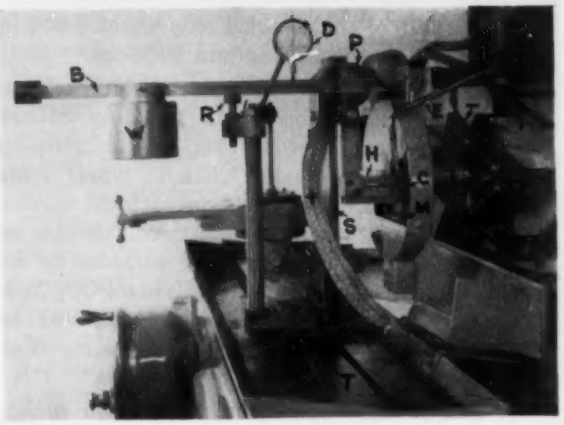
Ultrasonic grinding single tools shows promise. Ability to cut sharp corners under test . . .

about at the same rate as a vitrified bonded diamond wheel used conventionally. At the same time they used only 7 to 21 pct as much diamond. At 145 amps per sq in. diamond usage was equally low, but rate of cut was about one-third lower than at 250 amps per sq in. Overall savings were effected only when a rate of cut approaching that of a standard vitrified diamond bonded wheel could be maintained.

The second new method, electro-sparking is already in commercial use. The workpiece is one of the electrodes in an electric circuit with a properly shaped electrode in the other. A rapid series of sparks or arcs is formed between them in a non-conducting fluid. The electrode is consumed at a relatively high rate.

In electro-arching, an arc is struck and maintained between the electrode and the work, using direct current and a conducting fluid. The work is anodic and the cathode, a shaped electrode, is consumed slowly. This process is most suitable for cutoff, for hard metals and carbides.

An electro-erosive machining method, combining electrolytic and electro-arcing effects is under development.[11] Electro-erosive methods for machining carbides and hard metals can be used



ELECTROLYTIC grinding of carbides is tested by constant pressure setup on grinder in Norton Co. lab.

for cutting, grinding, boring, shaping and tapping of carbides and hard metals. The method is important in that cutting and grinding rates are not affected by the material being machined, so that industrial diamonds are not needed.

Test results on the influence of hardness on cutting time are shown in Table I. The cutting times, averaging 69 sec, showed normal dispersion, leading to the conclusion that hardness has no effect on cutting time. These tests were made on carbon tool steel. Other results showed that cutting and also time decreases as current increases, and also as wheel peripheral speed increases.

A machine incorporating the principles of electro-erosion, now under test will permit straight grinding and shaping, straight, radial and form grinding or polishing, boring, and grinding of chipbreakers.

In the ultrasonic process, abrasive action removes the metal. A finely divided abrasive is fed in a liquid medium between the tool and the work. Rubbing action is gained by vibrating the tool rapidly. Vibration is as high as 29,000 cycles per sec. Amplitude is only a few thousandths of an in. Abrasive is ordinarily a relatively low cost 280-grit boron carbide. The tool is consumed in the process.

Ultrasonic techniques can be used for grinding single-point tools. They produce good surfaces with no cracks but the ability to produce sharp corners needs to be tested.

TABLE I

HARDNESS INFLUENCE ON CUTTING TIME

Specimen	Hardness, Rc	Cutting Time, Sec
1	64.2	70
2	61.0	75
3	54.2	61
4	44.2	69
5	37.0	66
6	24.5	71
		S = ± 4.8 sec

TABLE II

HIGH SPEEDS AT WORK

Part	Material	Maximum Speed, sfpm*	Feed, ipr
Camshaft	Cast Iron	342	0.014
Sun Gear	Steel Forging	423	0.011
Gear	Steel Forging	415	0.014
Gear Shaft	Steel Forging	852	0.015
Pinion Shaft	Steel Forging	959	0.016
Pinion	Steel Forging	1200	0.015
Bearing Race (turning)	52100 Steel Forging	670	0.024
Bearing Race (forming)	52100 Steel Forging	945	0.006
Bolt	1045	740	0.015

* Ordinary speeds range from 250 to 300 sfpm.

The Iron Age References

1 "High Speed Machining—A Primer," March 6, p. 224.
2 "Bearing Races Machined at High Speed," Nov. 6, p. 180.
3 "Carbide Tools Challenge Efficiency of Automatic Screw Machines," Oct. 2, p. 97.
4 "How to Machine Titanium," April 17, p. 107.
5 "Carbon Dioxide Coolant Lowers Tool Grinding Costs," Aug. 14, p. 124.
6 "Central System Distributes CO_2 Coolant for Grinding," Aug. 14, p. 126.
7 "Jet Sprayed Oil Ups Tool Life 1200 Pct," Jan. 17, p. 97.
8 "What You Can Do About the Diamond Wheel Shortage," Mar. 6, p. 203
9 "New Machining Techniques Evaluated," Mar. 20, p. 103.
10 "Electrolytic Grinding of Carbides Fully Tested," Nov. 13, p. 162.
11 "Another Electro-Machining Method Shows Promise," May 29, p. 88.

HEAT TREATING

Speeding up of all phases of heat treating operations has decreased processing costs and produced better parts . . .

◆ MECHANICS OF HEAT TREATING—faster heating, improved quenching, better materials handling methods, elimination of distortion—point the trend of developments to come.

Elimination of distortion by quenching under pressure has been successfully tried with armor plate between ¼ and 3 in. thick with minimum distortion resulting.[1] A 2500-ton HPM Fastraverse hydraulic press is used. Dies, designed to handle plates up to 70 x 20 in., permit rapid, uniform quench over the entire area of the plate.

Expensive straightening of auto gear and pinion units has been virtually eliminated in an unusual setup which rotates parts after heating and before quenching.[2] As the parts come from the furnace they are loaded into a special quenching unit, rotated at 300 rpm for 7 sec before quenching starts (see photo). Once all parts required straightening but now only 3 pct need straightening, seventy-five pct fewer units are scrapped.

Improved quenching has been given considerable thought by heat treat engineers. Development of a high speed quenching medium, Houghto-Quench K, has helped plants meet rigid heat treating specifications set forth in MIL-H-6873.[3]

Flame harden 500 pieces per hr

Wider application of flame hardening is in the picture for the future. Last year methods of using natural gas as a fuel in one flame hardening machine was perfected. One auto company has developed a method of flame hardening transmission cams at close to 550 pieces per hr.[4] After loading the cams into the machine, the operator starts an automatic hardening cycle. Oxygen-propane flame brings cams to heat. Parts are dropped into an oil quench, conveyed out of machine to tote pans.

Combination flame hardening deep freeze is being used successfully in treating machine tool wear strips up to 16 ft. long.[5] A specially designed flame hardening machine equipped with automatic controls is used.

After heating and water quenching to 90°F, parts are transferred to an industrial chilling unit. Strips are held 24 hr at 120°F for stabilization or sub-zero transformation of retained austenite. Methylene chloride solution is used as a heat transfer agent.

Important progress is being made in material handling techniques of parts in heat treating operations. Lawnmower blades at one plant are austempered in lots of 55 blades, at the rate of 600 per hr.[6] Blades, SAE 1060 and 1070, are arched, twisted to shape before heat treating. Salt bath installation is completely conveyerized. One man handles loading and unloading. No quenching fixture is used and blades hold their shape during heat treatment.

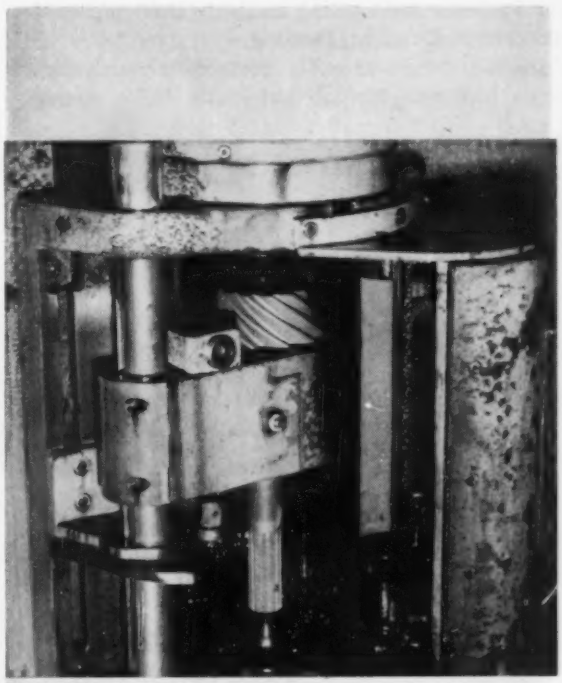
A more completely automated heat treating operation is demonstrated in one defense plant's thoroughly automated shell production setup.[7] Heating-for-forging and heat treating processes are completely integrated.

Annealing at normalizing temperatures

Fast heat with radiant gas above the critical temperature has replaced salt bath annealing at one shop. Heating time has been reduced from 1 hr to 2 min. Higher production rates in making 81-mm shells are possible. Annealed hardnesses are similar to those produced by salt bath methods. Microstructures are not the same. Pearlite colonies are smaller, more evenly distributed in gas annealed shells.[8] This method of softening may find much wider use this year.

Iron Age References

1 "Armor Plate Quenched Rapidly, Uniformly In Hydraulic Press," Oct. 16, p. 97.
2 "Automatic Heat Treating Speeds Gear and Pinion Production," Nov. 20, p. 128.
3 "Fast Quench Oil Improves Hardenability In Aircraft Steels," Jan. 24, p. 72.
4 "Flame Hardener Treats Cams At High Speeds," Mar. 20, p. 98.
5 "Unique Line Hardens and Chills 16-ft Pieces," Apr. 17, p. 120.
6 "Austempered Lawnmower Blades Are Hard, Tough," July 31, p. 88.
7 "Rotary Furnaces Feed Automatic Steel Treating Line," May 8, p. 122.
8 "Fast Gas Furnace Anneals At Normalizing Temperature," Nov. 20, p. 140.



PINION shaft mounted for hot spin-straightening. Formerly, all parts needed straightening; now only 3 pct need further work after leaving here.

AUTOMATION

Industry answer to mounting labor and material costs requires fewer workers with higher skills.

◆ TODAY "automation" is common to many industries. Detroit's mass production assembly lines laid the groundwork. Henry Ford's first use of the assembly line idea started when he began pulling an automobile chassis past stocks of parts spaced at regular intervals. It probably never occurred to Mr. Ford then that some day not only would the parts be assembled on moving conveyers but conveyers would be built into the machines making the parts—thus giving birth to automation.

The auto industry has its own word to describe this phenomenon: Automation, coined by D. S. Harder, vice president-manufacturing, Ford Motor Co.

At Ford and elsewhere, automation refers to automatic handling of parts—in the foundry, the forge shop or metal press plant, the machine shop. While the part is moved from one station to another, electrical or other controls trigger the processing cycle.

Automation has both advantages and disadvantages: In the auto industry automation is used everywhere. In the large automobile production foundries we now have automatic shell molding machines, core blowers, sand distribution systems and casting cleaning installations—and automatic straightening.

In the forge shop, a completely automated forge line will include automatic billet shears, feeding and removal of billets from the heating furnace, descaling and pre-forming. Press forging is semi-automatic. Operations in the trim press, flange forging, straightening, heat treating and cleaning are, for all practical purposes, automatic and practically 100 pct mechanized.

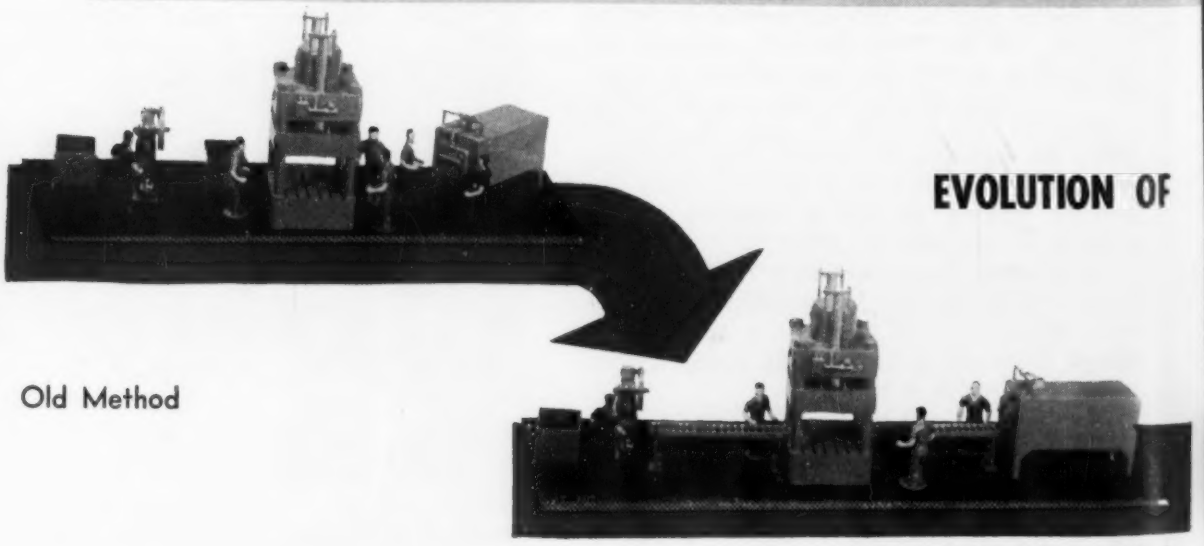
The same trend toward automation of an entire series of operations can be found in the press shop.

There is a noticeable leaning toward simple automation devices at the Ford-Buffalo Press Plant where the maintenance problem has been reduced as compared with earlier designs and the new gadgets are precise in operation. All of these are important trends in automation today.

An excellent example of a multiple operation is a 32-station machine used by Chrysler Div. to machine all of the holes in the top and both cylinder head faces of the Chrysler V-8 engine block. There are 32 stations with 3-way heads and both vertical and angular units. These stations include one loading station, 11 machining stations, three roll-over stations, 15 idle stations, one automatic gaging station and one unloading station plus a conveyer. The single unit performs 198 operations.

This machine was selected not only as an example of automatic handling, but also because it is equipped with several of the latest devices adapted to automation. There is a "roll-over" station to remove chips. The automatic gaging station detects holes improperly drilled for depth and also broken drills. So-called qualifying gages have nothing to do with sizing of holes. They make certain the casting will move through the machine without jamming that might be caused, for example, by failure to include a core in the casting.

Use of tool control systems designed to facilitate regular tool changes is growing. The Cross Co. of Detroit has introduced one that's very successful.



EVOLUTION OF AU

Old Method

Materials handling added

At the new Ford-Cleveland engine plant, a large Cincinnati horizontal tunnel-type broach, equipped with replaceable carbide tool bits and blades, broaches blocks and cylinder heads at a rate of 150 sfpm. After the machine picks up a block the entire cycle, including positioning, clamping, broaching and discharge, follows automatically.

A duplex machine at this plant combines roughing and finishing operations on a crankshaft in the same cycle. Automatic loading and unloading was adapted to this machine. Locating and clamping are done by power actuation. The operator merely assists in positioning and clamping.

Ford is assembling five different fuel tanks in one Rouge plant department.[1] A maximum output of 5000 tanks of all types per 8-hr shift has been reached. Two sides of the tank are welded simultaneously. The tank is then turned 90° to weld the two end flanges. A battery of seven presses handles hole piercing, clinching and other operations. Welding time per piece has been reduced substantially.

Automation has branched out into testing. A 12-station testing press has been tooled so that a single operator can test 600 3.5-in. rocket motors per hr at pressures up to 25,000 psi.[2] Older methods permitted only 100 tests per hr. Each rocket motor had to be threaded into the fixture manually and air pressure applied. Stamping and the inspector's marking were separate operations.

Using smaller, simpler and sometimes multiple units to insert a sheet metal blank into a die or to remove it is another important application of automation. Automatic spraying with drawing compounds and the use of ejector or knock-out pins in dies is on the upswing. Locating gages, built into the press setup, are designed to permit some flexibility in the blanks used in the press. New types of conveyers and new fixtures often have to be designed to achieve automatic press line functioning.

Automating a production line may even combine operations on two different parts. Ford is coining right-hand and left-hand parts in a machine fed by two operators.[3] Using a double feed, a single stroke of the press coins both the right-hand and left-hand parts, unloads and delivers them automatically from the machine.

Also on the upgrade are use of automatic inspection gages and automatic tool dressing and setting. A machine with cutters that are set automatically is operating in a large auto plant.

Some practical rules on automation have been developing with experience. They were described recently by David A. Wallace, president of Chrysler Div.

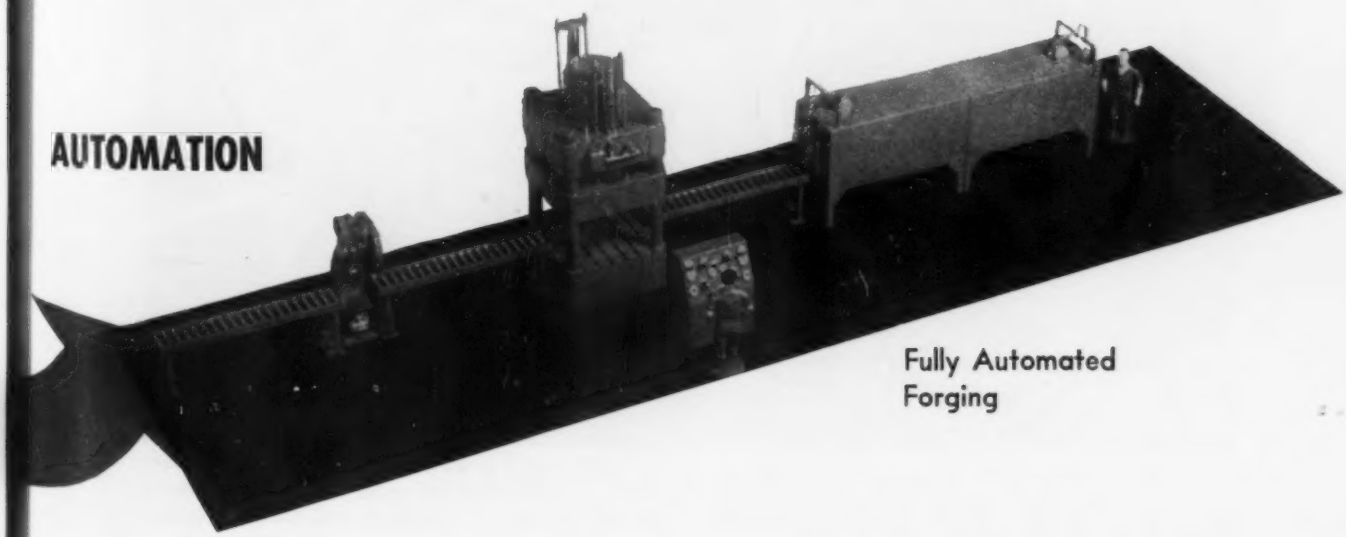
Multiple locating points a problem

On an automobile cylinder block or cylinder head, Wallace points out, where it is possible to have a bare minimum of locating points, each of which is an accurately machined surface, simplicity of design of automatic equipment is permissible.

A fender, however, will require location on an entire surface rather than a single point. This greatly increases the locating problem although such parts are being made successfully.

Other factors to consider are (1) type of tooling, (2) type of process, (3) whether operations are performed on one side only, (4) space requirements.

Long-term potential of automation is excellent —particularly in more mass production applications. Automation is industry's answer to the challenge of constantly mounting labor costs and more expensive materials. The solution is in productivity. Yet, automation will require more highly skilled workers. In a completely auto-



Fully Automated Forging

Re-evaluation of transfer-type machines will produce standardization of these specials . . .

matic factory no unskilled help could be employed.

The automobile engine transfer machine of maximum size has probably not yet been built. But size limitations are now apparent. This year may see a re-evaluation of the big transfer machines for the auto industry, particularly where precision units like gears are involved.

Designing machine tools to permit the finished part to move through a series of machines instead of being inserted and withdrawn from the same side is a problem machine tool builders may be asked to face in 1953.

Three-dimensional "Visual" models on previous pages furnished by Visual Planning Equipment Co., Inc.

ADVANTAGES

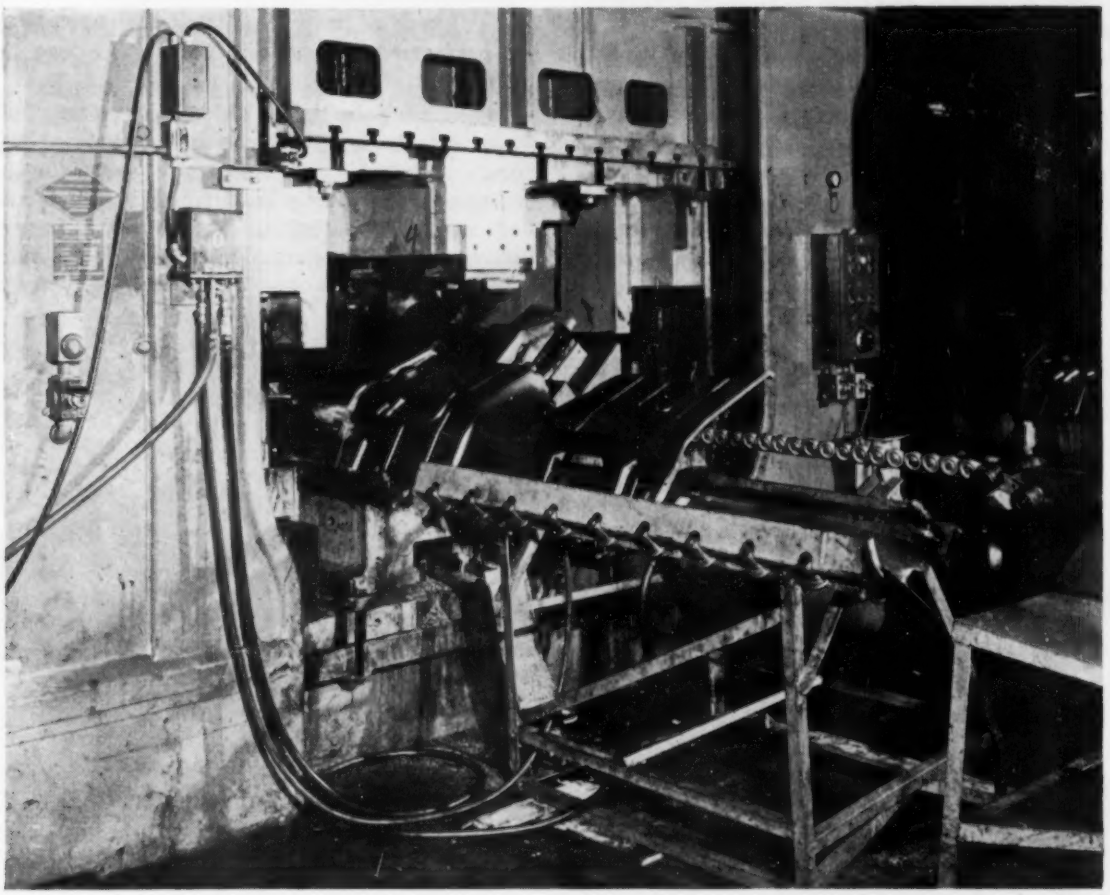
(1) Direct man-hr per part produced are greatly decreased.
(2) Production rate per hr by a machine or press is greatly increased.
(3) Consistent high quality production is maintained.
(4) Safety is increased by eliminating hazardous handling.
(5) Worker fatigue is reduced.

DISADVANTAGES

(1) Maintenance costs are invariably increased.
(2) Additional engineering costs, both in design of the part and equipment, are incurred.
(3) Costly rearrangement of buildings and equipment is often necessary.
(4) Automation frequently requires very costly, specialized equipment.
(5) The economic justification of automatic handling depends on long runs. This means automation is usually confined to parts which do not change every year.

The Iron Age References

[1] "Automation Speeds Fuel Tank Assembly Test." Sept. 25, P. 122.
[2] "Bazooka Rocket Motor Testing Now Fully Automatic." Mar. 20, P. 98.
[3] Automation at Ford. Talk by John McDougall, Ford Motor Co., Westinghouse Fourth Bi-Annual Materials Handling Conference, Oct. 28 & 29.



STAMPING PRESS LOADER is an automation device which feeds dash panel into trim press without manual effort. Wheel conveyers are arranged to support piece in same position it will occupy in die. This view shows dash panel part way into press. Conveyer for removal of scrap can be seen projecting from die below loader.

MELTING

Vacuum melting methods in both ferrous and nonferrous fields are growing. Research on levitation melting continues . . .

◆ METHODS OF MELTING metals are changing fast. Some of this change was activated by industry's demand for the new metals. Other changes evolved through refinements and improvements on conventional methods of melting conventional metals. Vacuum melting, formerly restricted to laboratories, is now a standard production method in titanium and similar highly reactive metals. Skull melting of titanium to make titanium castings, although not used in tonnage, is certain to increase. In this case, the furnace and the mold are both enclosed in vacuum.[1]

Vacuum melted 52100 under test

Vacuum melting of copper, nickel and iron to high purity has permitted their use in pure research and in vacuum tubes for radar and like equipment. Usually in melting metals for this type of application, an induction furnace is used. But in melting titanium arc furnaces are more popular. A glass to metal sealing alloy of about 29 pct Ni and 17 pct Co is being furnished to very closely controlled purity specifications and is supplied in strip rod and tubing. In 1951 for the first time standard bearing steel 52100 was vacuum melted. Tests indicate that alloy steel of this type may soon be used commercially on special applications. In this case, the total impurities are extremely low and the fatigue and endurance limits of the vacuum melted steel are greatly improved.

Vapor deposition outgrows jewelry trade

Vapor deposition, which technically can be qualified as vacuum melting, is growing by leaps and bounds. Almost any material, metallic or non-metallic, can be deposited by this method.[2]

Last year the biggest use of this method was still restricted to production of jewelry, but industrial applications are under test. Depositing calcium on electrical strip steel to prevent adhesion during annealing was investigated last year.

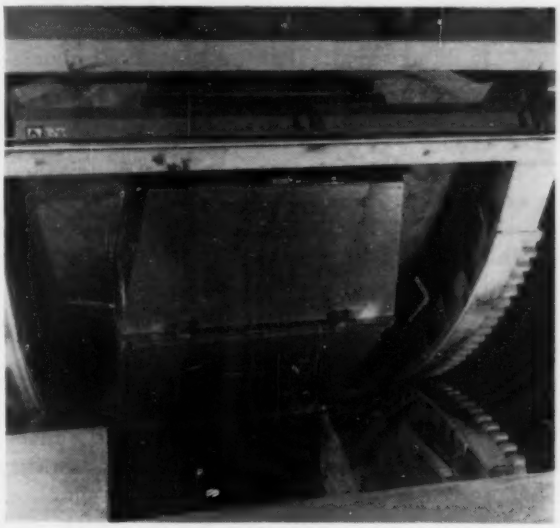
Of the newer melting methods announced last year, Westinghouse received top billing with levitation melting.[3] This melting in vacuum without crucibles employed magnetic fields to hold the metal aloft. Although not yet commercially applied, levitation melting has a wide horizon of possible applications.

Today, research centers on new methods of levitation and melting in vacuum under inert gases rather than in air. Up to 1 lb has been melted in air but 80 g of aluminum is the max amount yet melted in vacuum.

In the regular melting units, induction stirring, originally developed in Europe, is now being used in this country. By midyear we should know how amenable this process will be to American practices. Furnaces for smelting of ferroalloys are also changing. Self-baking electrodes[4] and rotating hearth furnaces are being investigated and some such units are under construction. As yet, the possibility of self-baking electrodes on our type of electric arc furnaces for steel melting is remote.

Late in the year, a new two-electric furnace melting shop started operation. These unpublicized furnaces are of unique design in that they preheat the scrap change prior to actual melting and are bottom tapped into slab size molds. Before the year ends, these furnaces will either make steel melting history or be found entirely unsuitable for steel production.

Of much more economic value to standard steel production has been the consistent improvements in heat times and quality of the regular tonnage products. Openhearth furnaces making 160 tons of low carbon steel are now being tapped in about 9 hr. Electric furnace heat times, even for some difficult stainless grades, have been reduced to 5 hr in some cases.[5]



CLOSE-UP OF INDUCTIVE STIRRER from slag-off door side of an electric furnace at Timken Roller Bearing Co. Operation of the stirrer was described in The Iron Age, Dec. 25, 1952.

The Iron Age References

[1] "Titanium, Our No. 1 Problem Metal," Oct. 16, Part II, p. 111.
[2] "Vapor Deposition May Solve Today's Casting Problems," Apr. 10, p. 113.
[3] "Metals Melted Without Crucibles," July 31, p. 83.
[4] "Self-Baking Electrodes Spur Development of Bigger, Better Furnaces," Aug. 28, p. 95.
[5] "Stainless Steel Melting Practices Have Changed," Dec. 4, p. 165.

CASTING

Shell molding and continuous casting revolutionize output of many types of metal parts . . .

◆ SHELL MOLDING reached the shakeout stage in 1952. In plant after plant, foundrymen eased into pilot or commercial production. An estimated 150 foundries are testing and producing. A rich experience record of what shell molding can and cannot do, of how and where it can compete with established foundry procedures is being acquired.

Two important trends stand out: (1) A stiff cost battle between shell molding and conventional foundry methods is developing; (2) Shell molding will supplement rather than replace conventional foundry techniques.

Hard facts of foundry economics will determine where and how shell molding will be applied. Careful testing and cost evaluation for each and every part design is a must.[1] Initial production costs for shell molding have often been higher than anticipated.

The growing knowledge of shell mold techniques is in part demonstrated by the increasing size of castings. Castings up to 200 lb are now being made. Only a year ago, casting weights ranged between 20 and 30 lb. Pattern plates to 30 x 45 in. are available in new automatic moldmaking machinery.

Casting to closer tolerances

Shell molding is a precision casting method. Castings may be produced to closer dimensional tolerances, with a subsequent reduction in machining costs. Castings have an extremely smooth finish—compared with sand castings—making them more attractive and reducing cleaning costs.

Since fewer risers, chills and gates are needed, metal loss is reduced. Shell molds are hard, easy to handle. They occupy little space, do not absorb moisture, can be made in quantity and stored in anticipation of future production. Reduction in pattern equipment which this makes possible may in itself present a substantial potential saving in foundry costs.

Mold production per man hour can be considerably increased. Skilled labor is not needed to make shell molds.

But the method has its limitations. More rapid cooling rates in green sand molds give finer as cast grain size. Shells thicker than ¼ in. may give rougher surfaces—possibly due to loss of permeability. Some tolerances are more easily held than others. Hydrostatic pressure causes some mold spread. Offsetting this is complete elimination of mismatches, a common foundry headache.

Experience with aluminum and magnesium shell mold production is still limited. Where magnesium is poured, however, castings are difficult to shake out, particularly in depressed areas.[2]

Fast, thorough drying and curing of shells is an important factor in development of the shell mold technique. The mold cycle, which once took 3 or 4 min, has been cut to about 1 min. Research men are striving to cut this time.

The moldmaking cycle ties up an expensive metal pattern plate. Costs of duplicate pattern plates needed to speed mold production must be balanced against the total number of molds required. There is one project under development which may drastically cut the cost of metal pattern plates.

Most machines big, expensive

Many foundry engineers are working on automatic machines capable of speeding up the moldmaking cycle. For the most part these machines are big, expensive. More important, such machines represent designs in flux in an operation yet unperfected. Design changes will undoubtedly come rapidly.

A happy marriage is that of nodular or ductile iron and the shell mold process. Nodular iron has properties, in addition to strength and ductility, which make it suitable for the shell molding process. Good surface finish, relative insensitivity of surface to pouring temperature and close control of surface chemistry are possible with ductile iron.

One major foundry, on a pilot plant basis, has successfully turned out ductile iron castings weighing over 100 lb each. Using an experimental turntable, better than 75 complete molds (150 shells) are produced on an 8-hr shift. Eventually this one unit is expected to yield 45 tons of castings per day.

Another pilot plant operation has successfully produced both gray and ductile iron shell mold castings for over a year. Two men handle all operations on a specially designed 4-station machine used to produce the molds.[3]

Outstanding in the commercial application of shell molding to conventional foundry practice is the shell molding of stainless valves and fittings in quantity.[4] An increase in metal yield of 20 to 35 pct, plus better tolerance and smoother finish resulted.

Elimination of cleaning problems, improved working conditions have made the operation pay off. No backup is used in pouring the 304 and 316 stainless. Molds are hung from a specially designed rack. Standard green sand cores are used.

Camshafts, rocker arms, valves, crankshafts and transmission parts are being produced by shell molding by an auto parts maker.[5] Less adherence of sand to castings and reduction in sprue metal is reported. Shell molds have higher strength than green sand and improved shakeout. Less scrap and closer control of surface chemistry are big advantages.

Weight of a 64-lb crankshaft is held within ounces in production runs. Alignment along the axis is held within a few thousandths. Surfaces, vertical to the horizontal axis, need little draft and no machining.

Excitement about shell molding has caused many to overlook possibilities in shell cores. Shell cores, compared costwise with regular sand cores, are in a more favorable position than shell molds v. sand molds.

Nonferrous foundries are trying shell molding. And in some cases results are excellent. Where shell molds are used to pour magnesium castings,[2] a substantial reduction in costs is sometimes possible. But the method is viewed more as a supplement to present methods than as a replacement.

In one case, castings made by sand cast methods were hard to clean up due to parting line fins and surface roughness. Considerable scrap loss was encountered due to misruns—50 pct—because wall thickness in some sections of the part is only 3/64 in.

CONTINUOUS CASTING MACHINES*

	COMPANY	METALS CAST				
		Aluminum	Brass	Copper	Magnesium	Steel
Installed or on order	American Metal Co.			1		
	Bridgeport Brass Co.		3			
	Scovill Mfg. Co.		2			
	Allegheny Ludlum Steel Corp.					1
	Hunter Douglas Corp.	1				
	Babcock & Wilcox—Republic Steel					1
	Apex Metal Products Corp.	1				
	James Booth, Ltd. (England)	1	1			
	Imperial Chemical Industries Ltd. (England)					1 carbon
	Atlas Steel (Canada)					1 alloy
	Louvril (France)					1
	Nichols Wire & Aluminum Co.	1				
	Anaconda Wire & Cable Co.	1				
	General Cable Corp.	1				
Coming	East Coast				1	1
	Midwest					1 plate
	East Coast		1			
	East Coast	1				

* Includes machines operating commercially, on pilot basis, being installed, or being planned.

Biggest unknown in the shell mold picture is production of molds themselves. For the first time in foundry history pouring can be divorced from mold production.

Fragile, bulky sand molds could not be made far in advance of pouring because of space requirements, volume of sand required, and because sand molds could not be easily transported.

Production of metal pattern plates requires specialized skills and machinery of the toolmaking shop. Small foundries will be able to send part prints to specialized shell mold pattern shops. Pattern plates will be made to the foundry specifications. The same shop may then make and deliver shell molds to order, store pattern plates.

More continuous casting plants

Continuous casting is moving out of the experimental stage. For nonferrous metals, continuous casting is well established.[7] Only problem seems to be that of keeping the mold constantly supplied with metal. This demands an ample melting capacity.

Big advantage in continuous casting may come for the small steel plant. The plant needing additional capacity but unable to afford the heavy cost of a blooming mill and a soaking pit may find the answer in continuous casting.

Operation on a 24-hr basis will make a continuous casting installation profitable. But for steel there is a timing problem: How to pour a 200-ton openhearth within 1½ hr. Machines can handle large tonnages by the hour, with tonnage directly proportional to cross-sectional area. But with killed steels the melt will start to reboil if left in the furnace; or, if kept in a holding ladle, it may start a reaction. Either can ruin a heat.

Other end of the timing problem is pouring of small batches of alloy steels. Here there is hope. Furnaces may be timed to pour one after another with an alloy steel following a carbon steel. Metal would follow metal in the mold. While some scrap would be engendered, the continuous casting machine could operate continuously—an important factor in steel plant economy.

Stainless and alloy steels will be handled in a continuous casting machine planned by a Canadian steel company for operation in the fall of 1953. The machine has a cross-section of 100 sq. in.

The Iron Age References

[1] "Shell Molding Steals Foundry Show," May 15, p. 118.
[2] "The Shell Molding Process and Magnesium Castings," 8th Annual meeting of the Magnesium Assn. ..
[3] "Job Foundry Tackles Shell Mold Production," May 15, p. 109.
[4] "Shell Molded Stainless Valves and Fittings Now In Production," June 26, p. 112.
[5] "Core Maker Uses Ultra Modern Controls," May 15, p. 114.
[6] "C Process: Some Details Revealed," Jan. 24, p. 28.
[7] "Strip Rolled From Continuous Cast Bar," Apr. 10, 1952, p. 118.

STAMPING & FORMING

Larger, faster presses equipped with automation devices boosted productivity to new levels . . .

◆ TECHNOLOGICAL progress during the past 12 months in stamping and forming equals, if not surpasses, any equivalent period in the history of flat-rolled metal forming in the United States.

Can any other single year report: (1) so many large, powerful, fast presses placed in operation or ordered for future needs? (2) such a rapid increase in automatic press loading and unloading devices? (3) small presses of advanced design that will do the job of presses ten times larger? (4) introduction of new plastic dies which will change industry's tooling for short run or experimental metal stampings? (5) the introduction of scale model plastic prototypes?

The demand for larger presses is dictated by production and economic requirements. Faster press action, particularly in the automotive and appliance industries, is necessary to meet today's production schedules. Where stamping presses have been operating at 6 strokes per min, big presses operating at 8 to 10 strokes per min are now in sight. Some may go into service next year. Longer stroke presses are now being used, both to increase the range of products and to accommodate bigger dies.

New and better clutches have contributed to this development. New flywheel designs and motor drives with increased capacity have also been a factor.

Standards for presses are now being worked out on an industrywide basis, led by the automobile and appliance industries, through the Joint Industry Conference.

Standards for bed sizes, strokes and openings have, for example, helped reduce the number of single acting presses from 760, previously listed in manufacturers' catalogs, to about 440 today. The smaller group has more flexibility and greater possibilities for interchangeability.

Progressive dies, used extensively in small size, and long run automotive stampings are being extended to other industries. Some of these presses, fed from steel coils, are being operated at upwards of 250 strokes per min.

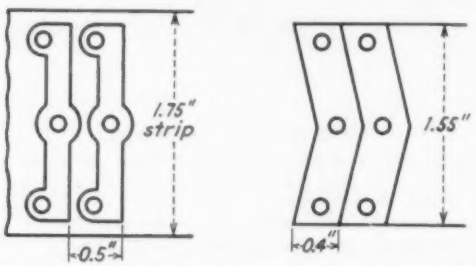
A few years ago, the use of progressive dies was limited to steel strip 6 to 8 in. wide. Today, progressive dies take strip up to 36 in. However, the majority of such installations are still limited to strip 10 in. wide or less.

Design of metal parts with the production process as well as the end use in mind has resulted in substantial economies. Among a number of steps being taken to reduce stock waste, die cost and scrap are the following: (1) avoiding pierced holes and special operations, (2) making blanks as nearly scrapless as possible, (3) blanking from the same strip where figures complement each other, (4) using slugs resulting from punching or piercing for further uses.

The drawing shows an example of a simple change in design that resulted in a material saving of 30 pct.[1] The saving in die cost was 33 pct as compared with the original die.

Another observed trend is the increased use of small precision stampings by many makers.[2]

Big presses are undergoing many design and structural changes. Small presses, too, have been affected by the demand for higher production at lower cost. The Wheelon direct hydraulic press is an example.[3]



SIMPLE DESIGN CHANGE saved 30 pct in material and 33 pct of the original die cost.

Plastic dies get big play

Mechanical feeding of steel blanks into a press and ejecting the formed or pierced stamping automatically has won many converts during 1952. Automation of high production press lines was undoubtedly the hottest subject for discussion in Detroit metalworking circles during 1952.

Chrysler announced its first use of plastic dies for short run truck parts during the past year. The entire auto industry is very much interested in plastic dies—and will use plastic tooling extensively during 1953.

Detroit will undoubtedly use a number of plastic dies this year to replace the hammer forms previously employed to make experimental models. For short run stampings, including some service parts, plastic dies look highly promising.

Plastic dies may replace Kirksite to a limited extent for low cost experimental tooling. Best guess now is that plastic dies will be combined with Kirksite and iron dies to provide low-cost short run tooling. The greatest single contribution of plastic dies may be in speeding up auto tooling.

Two other developments—small cast-to-shape iron dies for short runs (which require no Kellering) and plastic prototypes[4] of metal stampings caught the attention of Detroit's tooling experts.

The Iron Age References

[1] "Better Design Permits Cheaper Stampings." May 8, p. 113-115.
[2] "Stampings Make Strong, Accurate Camera Parts." Jan. 10, p. 92-94.
[3] "Small Press Does Job of Presses Ten Times Bigger." May 8, p. 125.
[4] "Plastic Prototypes Speed New Products." Sept. 18, p. 155-158.

FORGING

New types of forging presses are permitting radical design changes in many defense products . . .

◆ TECHNOLOGICAL PROGRESS by the forging industry last year moved along an unusually broad front, ranging from the complete integration of melting and forging in a large Chicago forge plant to the expanded use of huge presses rated up to 50,000 tons for aircraft forgings.

During 1952, automation came to the forging industry in a big way. As the year came to a close there were forge shops making both civilian and defense products in which steel billets were moved by mechanical, hydraulic or pneumatic devices through an entire series of forging operations without any manual assistance.

Forging presses replace hammers

A study of industry trends showed that forging presses are replacing forge hammers in many large production shops. The automobile industry was watching particularly the development of extruded-to-shape billets which may soon replace rolled-to-shape billets.

Forging maintenance supervisors were also watching with interest the use of cast refractories in barrel type forging furnaces. Experimental use of cast refractories has already proved so promising that experiments are being extended to box type furnaces.

Detroit saw its first fully automated forging line during 1952. The new installation[1] boosted production 100 to 200 pct and resulted in greater uniformity of crankshafts, while reducing unit costs. A Hagan rotary furnace handles 300 billets per hr. A 6000-ton Ajax forging furnace, largest in the auto industry, is used.

Heating methods changed

Defense has left its mark on the forging industry. An unusual forge upset machine[2] which forges jet engine blade blanks and makes valve stems and other parts but does not require dies. The process combines resistance heating with a hydraulic pushing ram and a moving anvil. Production rates as high as 600 pieces per hr are reported.

The jet engine blade program is undoubtedly getting a lot of attention from U. S. forgers. Most blades for jet production engines are forged but fabricated blades are replacing forged blades in the compressor stator of the J-47 turbo-jet engine.[3]

The growing use of forging presses in preference to forge hammers is based on sound economic analysis as well as other factors.

Advantages of the forging press include: (1) greater output, (2) longer equipment life, (3) excellent control of product quality, (4) more efficient use of power, (5) less operating skill required, (6) reduced maintenance expense, (7) adaptable to automatic handling of forgings.

Use of big presses and big hammers is increasing. At this stage of the development, however, it is difficult to see the use of very large presses for high production forge shops making, for example, automobile crankshafts or other large or medium-size forgings.

Such setups require special foundations and heavy power and crane installations. However, one company is installing a counter-blow forge for the production of very large forgings weighing in excess of 500 lb.

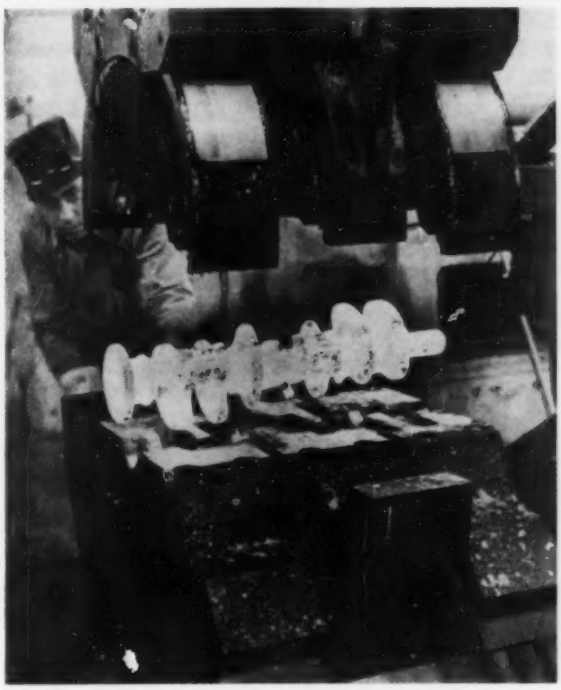
Methods of spring-mounting a forge hammer have been used. Vibration from forge hammers is negligible where this type of mounting is employed.

Forged aircraft outer skin panels were reported.[4] A program of testing the forging of 75 S alloy, 14 S, and Dow F S magnesium alloy is under way.

The year 1953 will undoubtedly see further use of automation in the forge shop. The development of new and better forging techniques for jet engine blades is high on the priority list.

The Iron Age References

[1] "Automated Forging Line Boosts Output, Cuts Costs." Oct. 2, p. 93.
[2] "Unusual Forging Machine Upsets 40 Times Bar Diameter." Mar. 13, p. 100.
[3] "Rolled Sections Replace Forged Jet Blades." Mar. 6, p. 227.
[4] "Develop New Forging Techniques for Aircraft Parts." Feb. 7, p. 135.



Crankshafts for a V-8 engine are forged flat and then twisted to the desired shape on this machine.

EXTRUSION

Extrusion will play vital role in engineers' dreams of "chipless production" of many parts . . .

◆ HOT AND COLD EXTRUSION kindled the interest of production men last year. This year popularity of the two subjects will really take hold as production facilities increase and product lines widen.

Hot extrusion by the Sejournet process became a fact for the U. S.[1] early last year when Babcock & Wilcox Tubular Products Co. extruded stainless steel tubing. So far five steel producers and one fabricator have taken out licenses to hot extrude basic steel products by the French process. B & W has been in commercial production of stainless, alloy and carbon tubing for some months. National Tube Co.'s installation has been completed and is now running shakedown tests in shapes and tubes of different steels. Allegheny Ludlum extruded its first tubing in November. The firm will be producing commercially later this year.

National Tube is the only licensee which uses a mandrel to pierce the billets when making tubing (see illustration). The other companies pierce on a separate vertical hydraulic press and then extrude on the big press. All companies use the glass plug in front of the die. On carbon tubing it is usually not necessary to wrap the pierced billet and the mandrel with glass blankets as is done with stainless.

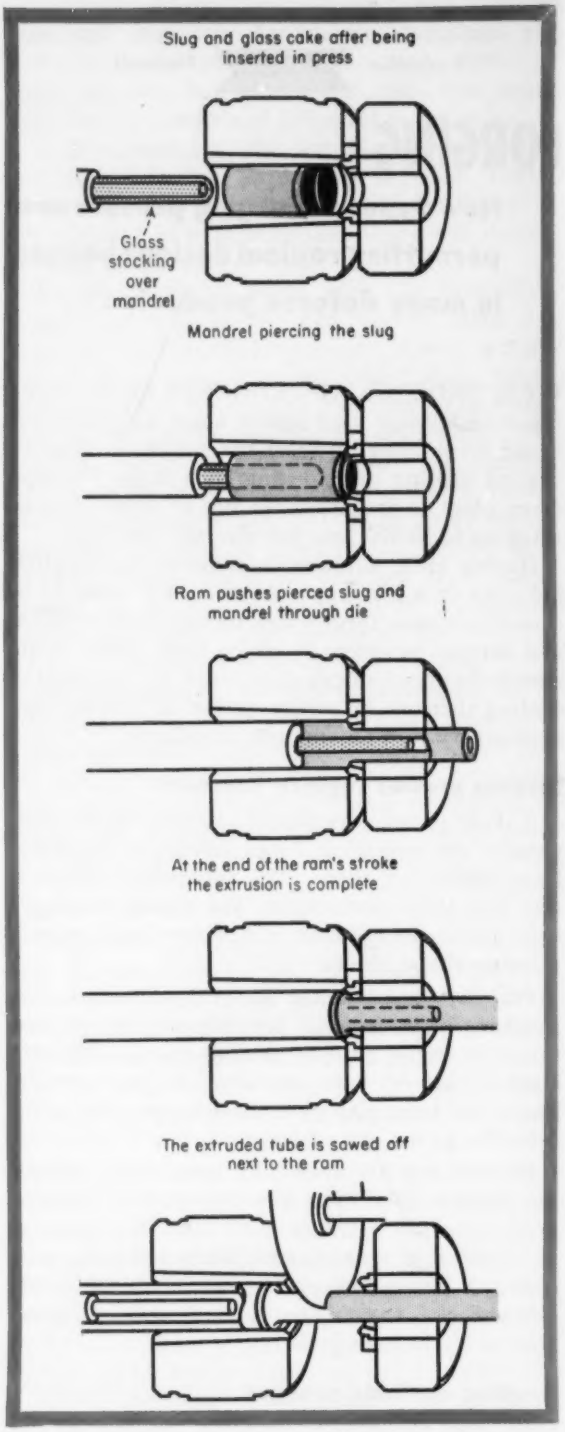
Extrusions made to date leave the die at speeds 20 to 30 fps. Although excessive twisting of early extruded sections was experienced, proper die setups have alleviated these conditions.

Not well publicized is the fact that metal consumers are enthusiastic about the tolerance and finish now available on almost any conceivable shape up to about 8 in. wide in any steel grade. Mass production of steel shapes can well trigger the next big step in the metals industry—"chipless production." Aluminum extruded shapes have already made heavy inroads in the nonferrous field.[2] Since machining ranks importantly in manufacturing costs of many items, the coming year will see the first steps toward chipless production of some mass produced metal items.

Often extrusion has been used because the material or product could not be economically made any other way.[3,4] But the real future for hot extrusion is in replacing conventional methods of forming such as rolling, forging, machining, etc.

Cold extrusion is the other step in this direction. The new $2.6 million cold extrusion plant being built at Warren, Ohio, will be used entirely for civilian products. The process has been proven on military items, mostly shells. So far the Liberty plant of Mullens has delivered over 1 million shells of the 81-mm mortar and 105-mm type. Heintz Mfg. Co., Inc., is working the bugs out of the extrusion plant it is operating for the U. S. Navy. Mass production starts this year.

Cold extrusion used as a forming process often makes heat treatment unnecessary.


Slug and glass cake after being inserted in press
Glass stocking over mandrel
Mandrel piercing the slug
Ram pushes pierced slug and mandrel through die
At the end of the ram's stroke the extrusion is complete
The extruded tube is sawed off next to the ram

The Iron Age References

1 "B & W Makes First Stainless Steel Tubing," Jan. 17, 1952, p. 53.
2 "Hot Extrusion Solves Production Problem," May 1, 1952, p. 139.
3 "Tough Alloy Steels Successfully Hot Extruded," July 3, 1952, p. 120.
4 "Techniques and Problems in Large Extrusion Production," Dec. 11, 1952, p. 158.

WELDING

Use of welding rod per ton of steel produced will hit an all-time high this year . . .

◆ MANUFACTURERS of welded products during 1952 were faced with many problems arising from the use of substitute materials. Many of these problems were continued in studies of prior years to which satisfactory solutions had not been found.

In their search for fabricating materials, many manufacturers selected 17 pct chromium steel (AISI type 430) as a substitute corrosion-resistant material for 18-8 stainless steel[1]. The properties and welding characteristics of 17 pct Cr steel are sufficiently different to warrant the most careful study before selecting it for a specific application.

Type 430 weld metal deposited by fusion welding has low toughness and ductility, more so than the heat-affected zone of type 430 base metal. It should be annealed if the toughness is to be improved. If annealing of the weldment is not contemplated, an austenitic chromium-nickel filler metal should be used to provide ductility.

The most widely used process is metal-arc welding. Heat input is far less than with either atomic-hydrogen or oxyacetylene welding. ASTM-AWS series E-430 coated electrodes are generally used for type 430. This specification indicates that pre-heating and post-annealing are usually required.

Submerged-arc welding is used for thick base metal, applying as few weld passes as possible. Because of high heat input and the large volume of metal deposited, 17 pct Cr steel must be carefully handled to prevent cracking. Austenitic chromium-nickel rod is often used but electrode selection must anticipate a 10 to 70 pct dilution of base metal with the rod composition.

The use of inert gas-shielded tungsten-arc welding has usually been confined to sheet and light plate. Welding speed is high and the amount of fused metal is small, thus minimizing structural change in the adjacent base metal.

In another move to save critical materials, the low-hydrogen, high-strength ferritic electrodes developed during World War II for welding high-alloy steels were put to use industrially[2]. These electrodes exhibited unusual characteristics which in certain respects were better than those of highly alloyed austenitic electrodes used for armored fabrication. At present, their use on armored vehicles is without restriction on plate thicknesses up to 5/8 in.

Two types of ferritic electrodes are widely used: a nickel-moly-vanadium type for use where no preheat or postheat treatment is required and a manganese-moly type for use where subsequent heat treatment is to be given.

Much work was done during the past year in attempts to weld titanium but the results belittle the efforts[3]. Welds in unalloyed titanium can be made easily and with good ductility and strength if certain precautions are taken. Titanium has a strong affinity for oxygen, nitrogen and hydrogen. Unless these contaminants are excluded from the weld zone when the metal is heated above 1500°F embrittlement will result.

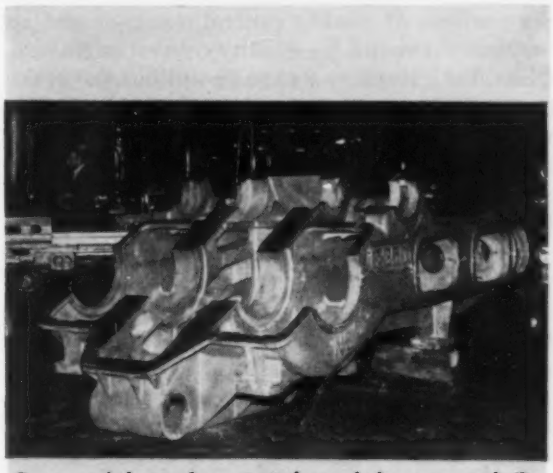
Another interesting development in welding is the use of iron powder as a backup material for welds in SAE 1015 and 1025 steels[4]. Experiments indicate that it has several advantages over copper or steel backup bars.

Welding continued to make advances over other fabricating methods. This trend is attributed to better design for welding which offers economies in time and labor and provides greater product durability. Ingot cars used in steel mills have withstood the extremely rough conditions to which they have been subjected[5]. These cars handle 42-ton live loads at temperatures as high as 1200°F and at the same time withstand the severe impact of stripping molds from the ingots.

Improved design for welding has made it possible for many manufacturers to replace heavy castings with weldments without sacrificing strength, rigidity or durability of a product. For example, the use of welded design for a petroleum slush pump reduced the overall weight by nearly 4000 lb[6].

The Iron Age References

1 "17 Cr Stainless Replaces 18-8 In Many Weldments," Part I, June 26, p. 97 and Part II, July 3, p. 128.
2 "Ferritic Welding Electrodes Save Alloy, Give Better Welds," July 24, p. 93.
3 "Metals for Tomorrow," Oct. 9, p. 275.
4 "Get Better Welds With Iron Powder Backup," May 8, p. 116.
5 "Fabricated Ingot Cars Stand Up," Feb. 28, p. 112.
6 "Fabricated Castings And Plate Make Lighter Pumps," Aug. 28, p. 100.



Power end frame for a petroleum slush pump as built up from plate and castings by welding. Use of this weldment allows for bearing design change and reduces weight of the completed unit by 4000 lb.

QUALITY CONTROL

No longer a large plant luxury, quality control is now vital to all types of manufacturing . . .

◆ THE MOVEMENT TO QUALITY CONTROL continued at a forward though sometimes uncertain pace in 1952. False starts were common, but there were signs that industry is adopting more scientific techniques.

Certainly quality control is no longer regarded as a large plant luxury. Methods range from fluoroscopy and supersonics on whirring production lines to rough control charts in small job plants. But whatever the system or size of the plant, management believes that quality control is a vital tool. It will become a more significant force when applied more effectively and more widely.

One of the recent trends in quality control instrumentation is the switch from fixed-limit gages to indicating units. One instrument manufacturer stated that sales of fixed-limit gages made up the bulk of his business a few years ago. Now he estimates sales of indicating gages account for 90 pct of sales volume.

Quality, an executive's job

Reason for this change is that extremely close tolerances such as those required in defense work cannot be registered on fixed-limit gages. Another advantage is indicating gages simplify reject prevention since they show the degree of error in a defective piece. Another trend is the growing awareness that responsibility for a plant's quality control system is an executive job and should not be left entirely to plant inspectors. As a result many firms have created the position of quality control manager and an increased demand for quality control engineers. Classified advertising pages point out the popularity of these specially trained engineers. Development of quality control would be speeded considerably if engineers were the cure all for ailing quality control systems. Unfortunately they are not.

There have been many failures in plants where control systems were directed by competent engineers. Reason for this was that the men executing the program too often become so involved in theories and statistics that too little was accomplished in the way of practical defect prevention. The potential value of statistical quality control[1] has hardly been tapped. One of the nation's top quality control consulting engineers told THE IRON AGE that only 2 to 3 pct of plants using statistical quality control are getting maximum results.

More encouraging is the fact that quality control methods have been somewhat improved by quality specifications in defense contracts. The Air Force has been particularly vigilant in enforcing its requirements.

Specification MIL-Q-5923A for quality control of aircraft and associated equipment requires that contractors submit an outline of their quality control methods for Air Force approval.[2] This has naturally caused wrangling between contractors and the Air Force over the amount and type of control needed. But such requirements have forced manufacturers who were using hazy quality control methods to adopt more efficient techniques.

Can cut waste 50 pct

Pressures are building which should make quality control even more important in 1953. Many businessmen foresee the return of more competition this year. It will make firms price conscious and thus cost conscious. Quality control, with its solid potential for cutting waste costs, will be given priority consideration.

A plant which sets up an effective quality control system can confidently expect waste costs to drop roughly around 50 pct. Estimated average waste per worker in mechanical industries ranges between $500 and $1000 per year, so savings made could be the difference between operating at a profit or going out of business.

A specific example of what can be accomplished by an effective quality control system in a small (180 workers) plant was documented last year.[3] Only five weeks after quality control techniques were used in some of the plant's operation rejects on these jobs dropped from 8 to 10 pct to less than 1 pct. In addition to savings on rejects and other benefits, this plant reported a good improvement in customer relations. Since adopting quality control, the company has been able to certify the quality of its production: result one of its largest customers cut inspection of incoming shipments 80 pct.

Methods of operating will change

Many industrial leaders regard the development of quality control as being just part of the growth of overall control methods. They believe there is a definite trend toward greater use of controls on production, costs, inventories and other items.

Changing economic times will heighten the emphasis on more scientific plant operation in coming years. In the next decade the work week will be further shortened while wage scales continue to climb. An increasing population will demand more goods and services.

The Iron Age References

1 "Modern Quality Controls Are Simpler To Use," May 1, p. 144.
2 "Quality Control Mandatory on New Air Force Orders," May 8, p. 119.
3 "How A Small Shop Uses Quality Control," June 19, p. 143.

Production forecast Processes

TESTING & INSPECTION

Tolerance gages built in rather than hung on machine tools. TV makes its inspection debut . . .

◆ MODERN ENGINEERING CONCEPTS, faster and more accurate manufacturing methods, and the high cost of "non-productive" inspection labor are calling the turn on development of improved new inspection methods and devices.

Speedier gaging operation, more "in-line" and automated gaging are factors shaping development of inspection methods and devices. New ways are constantly being sought to measure familiar dimensions more accurately and more rapidly. Completely new devices are needed to eliminate the human element in measuring.

Wider acceptance of electronic gaging devices heralds the day when more electronic gages will be built in rather than built on machine tools. Such gaging devices—combinations of electrical contact, variable inductance, variable capacitive, radiation, and resistance strain gages—may ultimately control entire machining cycles. This includes setting tools, checking port dimension, readjusting tooling when necessary, and rejecting off gage ports.

Use of new inspection devices begins at the point of metal manufacture. Chief improvement is the direct reading spectrograph or Quantometer which permits more accurate, faster melt analysis.[1]

Check 11 elements in 5 min

Analyses, including preliminaries on heats in the furnace, allow the melt shop to quickly determine the melt down chemistry as well as to make speedy checks before tapping. A full chemistry check of 11 elements in about 5 min is possible.

Greater precision in rolling sheet and strip is promised through use of beta gages on rolling mills. One company uses them in rolling strip for high frequency transformer laminations to a high degree of accuracy.[2] Two beta gages measure rolled strip from 0.0006 to 0.002 in. within 1 pct accuracy.

Consistency of radiation possible from radioactive material is substantially higher than could be anticipated from a generated source. Dependence upon absolute values is possible whereas in other systems a comparison method was always required.[3]

Contour projection gaging machines have attracted wide attention. On certain jobs optical gaging has definite advantages over mechanical gaging. Inspection time on an Ordnance rotor booster was cut from 4 min to 4 sec. Twenty-seven mechanical gages were replaced. Through use of an "optical bridge" an operator can rapidly detect part size variations to 0.0001 in. at all points gaged.[4]

Speed in gaging operations, plus "in-line" gaging is a continuing trend. Electronic sorting and gaging machines have proved valuable in speeding up the sorting and gaging operation. One auto company uses such a machine to sort and gage 3600 tappets per hr. The machine checks squareness, taper roundness and outside diameter. A contact sorter segregates electrical contact points at the rate of 10,000 an hr into oversize, undersize and on size batches.[4]

Air gaging to 0.0025 in. tolerances

Another precision air gage machine of high interest simultaneously checks 18 different points on the contour of a jet blade or bucket to a tolerance of 0.0025 in. on internal points and 0.0075 on external points.[4] The operator can read dimensions at a glance and gaging is done as fast as blades can be loaded and unloaded from machine.

Wider use of radioactive materials for inspection of welds is on the way. Photographic film is placed on one side of the weld, radioactive material on the other. Penetrating rays record any flaws. Greater insight on handling radioactive cobalt, iron, tungsten, and radium D—suggest wider industry in the future.

More accurate measurement of surface finish was made possible with two developments. A new gage developed by National Bureau of Standards, provides a nondestructive magnetic measuring of plated coating thickness where either the coating or the base metal is magnetic.[5]

Single and composite electro-deposited coatings can be measured to indicate of their value in preventing corrosion. The device uses the attraction between a small permanent magnet and the plated sample.

Ultrasonic inspection televised

Precision reference specimens of surface roughness, a set of master blocks accurate to a millionth of an inch were jointly developed by two big auto companies. Now any shop can calibrate a surface measuring device by the same standards as the engineer who worked with the original specifications.

Ultrasonics has been tied to television to give visual and more definitive analyses of words and inclusions with solids.[7] Location of the defect within a piece of steel, as well as size, can be seen on the TV screen.

The Iron Age References

[1] "Forge Shop Installs Compact Steel Melting Plant," June 12, p. 119.
[2] "Beta Gage Measures Strip Thickness," June 19, p. 149.
[3] J. Jaeger, Electric Gauging, Fifth Annual AIEE Conference on Machine Tools.
[4] "Economy, Speed, And Ingenuity Mark Tool Show," Mar. 27, p. 102.
[5] "Magne-gage Tests Plated Surface Quickly," Feb. 7, p. 149.
[6] "Standard Surfinish Blocks Now Available," Mar. 6, p. 226.
[7] "Metal Show Documents Technical Progress," Nov. 6, p. 170.

TOOL STEEL DIRECTORY

TOOL STEELS, DIE STEELS AND CARBIDES

To help the tool user in his selection problem, The Iron Age has already published its "Directory of Tool Steels" in 23 editions. This new directory is a complete revision to give the tool user far more information than he has ever had before. It now includes charts showing chemical and physical properties, and forging and heat treating temperatures for most tool steel on the United States and Canadian markets.

COMPARABLE TOOL STEEL BRANDS

CARBON AND C-V TOOL STEELS

SAE Designation ➤	W1 (Gr. 1)	W1 (Gr. 2)	W1 (Gr. 3)	W1	W2 (Gr. 1)	W2 (Gr. 2)	W2 (Gr. 3)
ASM Type Class ➤	IA Special	IA Extra	IA Standard	First Quality C Drill Rod	IC Special	IC Extra	IC Standard
Allegheny-Ludlum	Pompton Special	Pompton Extra	Pompton	Pompton D. R.	Python	Extra Carbon Vanadium	Carbon Vanadium
Bethlehem	XXX	XX	XCL	.....	Best	Superior	.....
Braeburn	Special	Extra	Standard	.....	Special V	.....	.....
Carpenter	No. 11 Special	No. 11 Extra	No. 11 Comet	Green Label Drill Rod	No. 11 Special Vanadium	No. 11 Extra Vanadium	Nitro
Columbia	Special	Extra	Standard	.....	Vanadium Special	Vanadium Extra	Vanadium Standard
Crucible	Sanderson or Crescent Special	Sanderson or LaBelle Extra	Black Diamond	Sanderson Spec. D. R.	.....	Alva Extra	Granada Vanadium
Disston	Best	Extra	Standard	.....	Best Va Tool	Extra Va Tool	Regular Va Tool
Firth-Sterling	Special Special ASV	Extra	Sterling	Globe	Special V	Extra V	Sterling V
Jessop	Washington	Lion Extra	Lion	First Quality	Washington Special	Lion Extra with V	Lion Vanadium
Latrobe	Special Carbon	Extra Carbon	Standard Carbon	Quality Carbon Drill Rod	Special Carbon with V	Reknown	Standard Carbon with V
Simonds	Red Label	Blue Label	Diamond S	.....	Red Label V	Blue Label V	Diamond SV
Universal-Cyclops	Special	Extra	Standard	Carbon Drill Rod	Special Draco	Extra Draco	Standard Draco
Vanadium-Alloys	Colonial No. 14	Extra L	Red Star Tool	Blue Anchor	Colonial No. 7	Elvandi	Red Star Vanadium
Vulcan	Vulcan Sp.	Extra	Fort Pitt	.....	Vulcan Special Vanadium	Vulcan Extra Vanadium	.....

NON-DEFORMING DIE STEELS

SAE Designation ➤	O1	O2	.....	.....	A2	D3	D5	.....
ASM Class ➤	II A-1 (Low Mn, Cr-W Oil Hardening)	II A-2 (High Mn Oil Hardening)	II A-3 Low W (Oil Hardening)	II B-1 (Mn Air Hardening)	II B-2 (5 Cr Air Hardening)	II C (High C—High Cr Oil Hardening)	II D-2 (1.50 C-Hi Cr)	II D-3 (2.15 C, Hi C-Hi Cr, Air H)
Allegheny-Ludlum	Saratoga	Deward	Utica	Airloy	Sagamore	Huron	Ontario	.....
Bethlehem	BTR	.....	67 Tap	BA-H	A-H5	Lehigh S	Lehigh H	.....
Braeburn	Kiski	S.O.D.	Keystone	.....	Airque	Superior 1	Superior 3	.....
Carpenter	.....	Stentor	.....	Vega	No. 484	Hampden	No. 610	.....
Columbia	EXL-Die	.....	.....	.....	EZ-Die	Superdie	Atmodie	.....
Crucible	Ketos	Paragon	Champion Extra	.....	Airkool	HYCC	Airdi 150	HYCC
Disston	Mansil	.....	Semi High Speed	.....	.....	812 Die Steel	Croloy	.....
Firth-Sterling	Invaro No. 1	Invaro No. 2	Meteor	Airmo	Airvan	Triple Die	Cromovan	.....
Jessop	Truform	Special Oil Hardening	.....	.....	Windsor	CNS-2	CNS-1	.....
Latrobe	Badger	Mangano	WT	.....	Select B	GSN	Olympic	.....
Simonds	Teenax-46	Simonds 864	Simonds O.H.D.	.....	Airtrue 51	.....	Simonds C.C.M.	.....
Timken	.....	Graph-Mo	.....	.....	.....	.....	.....	.....
Universal-Cyclops	Wando	.....	Para	.....	Sparta	Ultradie No. 1	Ultradie No. 2	Ultradie No. 1-M
Vanadium-Alloys	Non-Shrinkable, Colonial No. 6	.....	Red Star Tungsten	.....	Air Hard	Crocar	Ohio Die	Crocar
Vulcan	Vulcan Oil Hardening	Non-Shrinkable	Hardrite	Vairloy	Vuldie	Hi-Pro	Alidie	.....

SHOCK RESISTING STEELS

SAE Designation →	.....	S2	S5	S1	.....
ASM Class →	III-A (Cr-V)	III-B (Low Si-Mn)	III-C (High Si-Mn)	III-D (W)	III-E (W-Si)
Allegheny-Ludlum	Caroga	.....	802, 609	Seminole Medium	Seminole Hard
Bethlehem	Tough M	.....	Omega	67 Chisel	.....
Braeburn	.....	Triton	.....	Vitro	.....
Carpenter	.....	Solar	No. 481	.....	.....
Columbia	.....	.....	C. E. C. Impact	Buster-50	Buster-60
Crucible	Halvan	SMC 155	LaBelle Silicon No. 2	Atha Pneu	.....
Disston	.....	.....	D-29	Keystone Alloy Chisel	.....
Firth-Sterling	Demmler D	.....	Chimo	J-S	.....
Jessop	.....	R. T. S.	Magic	Top Notch	.....
Latrobe	Crown	.....	.....	XL	.....
Simonds	.....	Havoc	Orleans	Commando 47	.....
Universal-Cyclops	Orion	Venango	No. 67	Alco	Alco "S"
Vanadium-Alloys	Vanadium Type D	.....	Silman, Mosil	Par Exc.	.....
Vulcan	Hecla	.....	4870	Vulcan Q. A.	.....

HOT WORK STEELS

SAE Designation →	.....	.....	H11	H12, H13	H21	.....	H25	H26
ASM Class →	IV A-1 (0.65 C, 4% Cr)	IV A-2 (0.90 C, 4% Cr)	IV-B (5% Cr, No W)	IV-B-2 (5% Cr, 1% W)	IV F-1 (9% W)	IV F-2 (12% W)	IV F-3 (15% W)	IV F-4 (18% W)
Allegheny-Ludlum	EB Alloy	.....	Potomac M	Potomac	Atlas A	Atlas B	Mohawk	LXX-5T
Bethlehem	.....	.....	Cr-Mo-V	Cr-Mo-W	57 Hot Work	.....	57 Special Hot Work	.....
Braeburn	.....	.....	Pressurdie No. 3	Pressurdie No. 2	T-Alloy A	T-Alloy	T-Alloy B	Vinco Hot Work
Carpenter	.....	.....	No. 883	No. 345	TK	.....	.....	Star-Zenith Low C
Columbia	.....	.....	Firedie	.....	Formite No. 2	Formite No. 1	.....	.....
Crucible	LaBelle 89	Crescent Hot Work 2	Halcomb 218	Chro-Mow	Peerless A	Peerless LCT No. 2	Peerless LCT	Rex A Rex AA low C
Disston	.....	HRW	.....	873	872	.....	.....	.....
Firth-Sterling	.....	CYW	HWD-2	HWD-1	LT, LTL	.....	XDL	XDH (C.55) XDM (C.45)
Jessop	J Hot Work Die	JJ Hot Work Die	.....	Dica B	2B (LC)	2B (HC)	2B (MC)	.....
Latrobe	.....	Select M	V.D.C.	LPD M. G. R.	CLW	.....	EHW No. 1 CHW	Electrite No. 5
Simonds	.....	Chrome Hot Die	.....	.....	D. N. V.	.....	.....	.....
Universal-Cyclops	.....	Ajax	Thermoid A	Thermoid B	B-44-J	B-44	B-4	B-6-X
Vanadium-Alloys	.....	Choice No. 1	Hotform No. 2	Hotform No. 1	Marvel	SC Specia	Forge-Die	Red Cut Superior J. Temper
Vulcan	Vulcan No. 6 HW	Vulcan No. 4 HW	Vulcan Magal	TCM	Calo-Ferro 30	Calo-Ferro 45	Calo-Ferro .50	Wolfram Low Carbon

HIGH SPEED STEELS

MOLYBDENUM-BASE

SAE Designation →	M2	.....	M1	.....	.....	.....	M36	.....
ASM Class →	V A-3 (Mo-Di W-2V)	V A-1 (Mo-V)	V A-2 (Mo Low W-V)	V B-1 (Mo Low W-5 Co)	V B-2 (Mo Low W-8 Co)	V B-3 (Mo-Di W-5 Co)	V B-4 (W-Mo 8 Co)	V B-5 (W-Mo over 8Co)
Allegheny-Ludlum	DBL-2	VLM	LMW	Super LMW	.....	.....	Super DBL	.....
Bethlehem	66 H. S.	.....	Bethlehem HM	.....	.....	.....	.....	.....
Braeburn	Braemow M-2	.....	Mo-Cut	Como	.....	.....	.....	Congo
Carpenter	Speed Star	.....	Star Max	.....	.....	.....	.....	.....
Columbia	Molite	.....	.....	.....	.....	.....	.....	.....
Crucible	Rex M-2	Rex VM	Rex TMO	Rex TMO-5	.....	Rex M2-5	.....	.....
Disston	6 N 6 M-2	.....	Di-Mol	.....	.....	.....	.....	.....
Firth-Sterling	Star Mo M-2	M-10-V	Hi-Mo	Super Hi-Mo	Super Mo-Chip	Mustang Special	Circle M	Super Star-Mo
Jessop	Mustang	.....	Mogul	.....	.....	.....	.....	.....
Latrobe	Electrite Double Six	Electrite TNW	Electrite Tatmo	.....	.....	.....	Electrite Co-6	.....
Simonds	Molva T	Molva	STM	.....	.....	.....	.....	.....
Universal-Cyclops	Motung 652	Movan	Motung	Super Motung	Super Motung Special	.....	.....	.....
Vanadium-Alloys	Vasco M-2	Van-Lom	8-N-2	8-N-2-Cobalt	.....	.....	.....	.....
Vulcan	TM-6	.....	Vul-Mo	.....	.....	.....	.....	.....

HIGH SPEED STEELS

TUNGSTEN-BASE

SAE Designation →	T1	T2	T3	.....	T8	T4	T5	T6
ASM Class →	V C-1 (18-4-1)	V C-2 (18-4-2)	V C-3 (18-4-3)	(14-4-2)	V D-1 (14-4-2-5)	V D-2 (18-4-1-5)	V D-3 (18-4-2-8)	V D-4 (20-4-2-12)
Allegheny-Ludlum	LXX	ML	.....	.....	.....	Panther Special	Super Panther	.....
Bethlehem	Bethlehem Special HS	.....	Red Tiger	Extra Special	.....	Comokut	.....	.....
Braeburn	Vinco	Twinvan	.....	Gyro	.....	Braeburn Cobalt	Bonded Carbide Jr.	Bonded Carbide
Carpenter	Star Zenith	Super Star Zenith	.....	.....	Gold Star	.....	.....	.....
Columbia	Clarita	Vanite	.....	.....	Maxite	.....	.....	.....
Crucible	Rex AA	Rex Supervan	.....	Rex Champion	Rex 95	Rex AAA	Rex Super Cut	Rex 440
Disston	Kutkwik	.....	.....	.....	.....	.....	D-5-Co	.....
Firth-Sterling	Blue Chip	HV Blue Chip	.....	Star Blue C h	FS2-5	Red Chip	Circle C	.....
Jessop	Supremus	Supremus Extra	.....	Jessco	Jessco B	Purple Label	Purple Label Extra	King Cobalt
Latrobe	Electrite No. 1	Electrite No. 19	Electrite Vanadium	Electrite U	Electrite U. B.	Electrite Cobalt	Electrite Super Cobalt	Electrite Ultra Cobalt
Simonds	Red Streak	Lockport Special	.....	Niagara	.....	Tunco	Super Cobalt	.....
Universal-Cyclops	B-6	B-9	.....	.....	B-8	B-7	B-10	.....
Vanadium-Alloys	Red Cut Superior	EVM	.....	.....	.....	Red Cut Cobalt	Red Cut Cobalt B	Gray Cut Cobalt
Vulcan	Wolfram	Vulcan Super	.....	.....	.....	Wolfram Cobalt	.....	.....

Continued

CHEMISTRY, FORGING AND HEAT TREATING DATA

The tables on these two pages, published by the Society of Automotive Engineers, are a comparatively new way of classifying tool steels. This directory lists steels by these designations wherever they can be so classified and where that data has been furnished by the producer or distributor.

APPROXIMATE COMPOSITION OF TOOL AND DIE STEELS

SAE STEEL DESIGNATION	C	Mn	Si	Cr	V	W	Mo	Co	Ni
Water-Hardening Tool Steels[1]									
W1—0.80 Carbon	—	—[1]	—[1]	—[1]	—	—	—	—	—
W1—0.90 Carbon	—	—[1]	—[1]	—[1]	—	—	—	—	—
W1—1.00 Carbon	—	—[1]	—[1]	—[1]	—	—	—	—	—
W1—1.20 Carbon	—	—[1]	—[1]	—[1]	—	—	—	—	—
W2—0.90 Carbon-V	—	—[1]	—[1]	—[1]	0.25	—	—	—	—
W2—1.00 Carbon-V	—	—[1]	—[1]	—[1]	0.15-0.25	—	—	—	—
W3—1.00 Carbon-VV	—	—[1]	—[1]	—[1]	0.50	—	—	—	—
Shock-Resisting Tool Steels									
S1—Chromium-Tungsten	0.50	0.25	0.35[2]	1.40	0.20	2.25	0.40[3]	—	—
S2—Silicon-Molybdenum	0.50	0.40	1.00	—	0.25[3]	—	0.50	—	—
S5—Silicon-Manganese	0.55	0.80	2.00	0.30[3]	0.25[3]	—	0.40[3]	—	—
Cold-Work Tool Steels									
Oil-Hardening Types									
O1—Low Manganese	0.90	1.20	0.25	0.50	0.20[3]	0.50	—	—	—
O2—High Manganese	0.90	1.60	0.25	0.35[3]	0.20[3]	—	0.30[3]	—	—
O6—Molybdenum Graphitic	1.45	0.75	1.00	—	—	—	0.25	—	—
Medium-Alloy Air-Hardening Types									
A2—5% Chromium Air Hard	1.00	0.60	0.25	5.25	0.40[3]	—	1.10	—	—
High-Carbon High-Chromium Types									
D2—High Carbon-High Chromium (Air)	1.50	0.40	0.40	12.00	0.80[3]	—	0.90	0.60[3]	—
D3—High Carbon-High Chromium (Oil)	2.15	0.35[2]	0.35	12.00	0.80[3]	0.75[3]	0.80[3]	—	0.50[3]
D5—High Carbon-High Chromium-Cobalt	1.50	0.40	0.40	12.00	0.80[3]	—	0.90	3.10	—
Hot-Work Tool Steels									
Chromium-Base Types									
H11—Chromium-Molybdenum-V	0.35	0.30	1.00	5.00	0.40	—	1.50	—	—
H12—Chromium-Molybdenum-Tungsten	0.35	0.30	1.00	5.00	0.25[3]	1.25	1.50	—	—
H13—Chromium-Molybdenum-VV	0.35	0.30	1.00	5.00	0.90	—	1.50	—	—
Tungsten-Base Types									
H21—Tungsten	0.32	0.30	0.20	3.25	0.40	9.00	—	—	—
High-Speed Tool Steels									
Tungsten-Base Types									
T1—Tungsten 18-4-1	0.70	0.30	0.30	4.10	1.10	18.00	—	—	—
T2—Tungsten 18-4-2	0.80	0.30	0.30	4.10	2.10	18.50	0.80	—	—
T3—Tungsten 18-4-3	1.05	0.30	0.30	4.10	3.25	18.50	0.70	—	—
T4—Cobalt-Tungsten 18-4-1-5	0.75	0.30	0.30	4.10	1.00	18.00	0.80	5.00	—
T5—Cobalt-Tungsten 18-4-2-8	0.80	0.30	0.30	4.10	1.75	18.50	0.80	8.00	—
T6—Cobalt-Tungsten 18-4-2-12	0.80	0.30	0.30	4.10	1.75	20.00	0.80	12.00	—
T8—Cobalt-Tungsten 14-4-2-5	0.80	0.30	0.30	4.10	2.00	14.00	0.80	5.00	—
Molybdenum-Base Types									
M1—Molybdenum 8-2-1	0.80	0.30	0.30	4.00	1.15	1.50	8.50	—	—
M2—Molybdenum-Tungsten 6-6-2	0.83	0.30	0.30	4.10	1.90	6.25	5.00	—	—
M3—Molybdenum-Tungsten 6-6-3	1.15	0.30	0.30	4.10	3.25	5.75	5.25	—	—
M4—Molybdenum-Tungsten 6-6-4	1.30	0.30	0.30	4.25	4.25	5.75	5.25	—	—
M36—Cobalt-Molybdenum-Tungsten 6-6-2-8	0.85	0.30	0.30	4.10	2.00	6.00	5.00	8.00	—
Special-Purpose Tool Steels									
Low-Alloy Types									
L6—Nickel-Chromium	0.75	0.70[2]	0.25	0.85[2]	0.25[3]	—	0.50[3]	—	1.50[2]
L7—Chromium	1.00	0.35	0.25	1.40	—	—	0.40	—	—

[1] Water-hardening steels listed here are usually available in four grades or qualities as follows:
Special (Grade 1)—The highest quality water-hardening carbon tool steel, controlled for hardenability, chemistry held to closest limits, and subject to most rigid tests to insure maximum uniformity in performance.
Extra (Grade 2)—A high quality water-hardening carbon tool steel, controlled for hardenability, subject to tests to insure good service for general application.
Standard (Grade 3)—A good quality water-hardening carbon tool steel, not controlled for hardenability, recommended for application where some latitude with respect to uniformity is permissible.
Commercial (Grade 4)—A commercial quality water-hardening carbon tool steel, not controlled for hardenability, not subject to special tests.
On special and extra grades, limits on manganese, silicon, and chromium are not generally required in lieu of the following Shepherd hardenability limits:

		0.80 & 0.90 C	1.00 & 1.20 C
Shallow	Hardenability, 64th in. penetration	10 max; fracture grain size 8 min	penetration 8 max; grain 9 min
Regular	Hardenability, 64th in. penetration	9 to 13 fracture grain size 8 min	penetration 7 to 11 max; grain 9 min
Deep	Hardenability, 64th in. penetration	12 min fracture grain size 8 min	penetration 10 to 16 max; grain 8 min

On standard and commercial grades Mn and Si are generally 0.35 max each; Cr is 0.15 max on standard, 0.20 max on commercial. Total Mn, Si and Cr not to exceed 0.75.
[2] May be present in percentages other than shown.
[3] Optional element. Steels have found satisfactory application with or without this element.

PHYSICAL PROPERTIES, FORGING AND HEAT TREATING OF VARIOUS TOOL STEELS

SAE and AISI Steel Designation	Non-deforming Properties	Safety in Hardening	Depth of Hardening	Toughness	Resistance to Softening Effect of Heat	Wear Resistance	Machinability	Quench Medium	Preheat Temperature, F	Hardening Temperature Range, F (a)	Hardness After Quenching, Rockwell C	Tempering Temperature Range, F (a)	Hardness After Tempering, Rockwell C	Decarburization (prevention of during heat-treatment)
Water-Hardening Tool Steels														
W1—0.80 Carbon	Poor	Fair	Shallow	Good*	Poor	Fair	Best	Water	(b)	1420–1450	65–67	350–525	65–56	(c)
W1—0.90 Carbon	Poor	Fair	Shallow	Good*	Poor	Fair	Best	Water	(b)	1420–1450	65–67	350–525	65–56	(c)
W1—1.00 Carbon	Poor	Fair	Shallow	Good*	Poor	Good	Best	Water	(b)	1420–1450	65–67	350–525	65–56	(c)
W1—1.20 Carbon	Poor	Fair	Shallow	Good*	Poor	Good	Best	Water	(b)	1420–1500	65–67	350–525	65–56	(c)
W2—0.90 Carbon-V	Poor	Fair	Shallow	Good	Poor	Fair	Best	Water	(b)	1420–1500	65–67	350–525	65–56	(c)
W2—1.00 Carbon-V	Poor	Fair	Shallow	Good	Poor	Good	Best	Water	(b)	1420–1500	65–67	350–525	65–56	(c)
W3—1.00 Carbon-VV	Poor	Fair	Shallow	Good	Poor	Good	Best	Water	(b)	1420–1500	65–67	350–525	65–56	(c)
Shock-Resisting Tool Steels														
S1—Chromium-Tungsten	Fair	Good	Deep	Good	Fair	Fair	Fair	Oil	1200–1300	1650–1800	57–59	300–1000	57–45	(d)
S2—Silicon-Molybdenum	W Poor†	W Poor†	Deep	Best	Fair	Fair	Good	Water	(b)	1550–1575	60–62	300–500	60–54	(c)
	O Fair†	O Good†						Oil	(b)	1600–1625	58–60	300–500	58–54	(c)
S5—Silicon-Manganese	W Poor†	W Poor†	Deep	Best	Fair	Fair	Fair	Water	(b)	1550–1600	60–62	300–650	60–54	(c)
	O Fair†	O Good†						Oil	(b)	1600–1675	58–60	300–650	58–54	(c)
Cold-Work Tool Steels														
Oil-Hardening Types														
O1—Low Manganese	Good	Good	Deep	Fair	Poor	Good	Good	Oil	(b)	1450–1500	63–65	300–800	62–50	(c)
O2—High Manganese	Good	Good	Deep	Fair	Poor	Good	Good	Oil	(b)	1420–1450	63–65	375–500	62–57	(c)
O6—Molybdenum Graphitic	Fair	Good	Deep	Fair	Poor	Good	Best	Oil	(b)	1450–1500	63–65	300–800	63–50	(c)
Medium-Alloy Air-Hardening Types														
A2—5% Chromium Air Hard	Best	Best	Through	Fair	Fair	Good	Fair	Air	1200–1300	1725–1775	61–63	400–700	60–57	(d)
High-Carbon High-Chromium Types														
D2—High Carbon-High Chromium (Air)	Best	Best	Through	Fair	Fair	Best	Poor	Air	1200–1300	1800–1875	61–63	400–700	60–58	(d)
D3—High Carbon-High Chromium (Oil)	Good	Good	Through	Poor	Fair	Best	Poor	Oil	1200–1300	1750–1800	62–64	400–700	62–58	(d)
D5—High Carbon-High Chromium-Cobalt	Best	Best	Through	Fair	Fair	Best	Poor	Air	1200–1300	1800–1875	60–62	400–700	59–57	(d)
Hot-Work Tool Steels														
Chromium-Base Types														
H11—Chromium-Molybdenum-V	Good	Good	Through	Good	Good	Fair	Fair	Air	1450–1500	1825–1875	53–55	1000–1100	51–43	(d)
H12—Chromium-Molybdenum-Tungsten	Good	Good	Through	Good	Good	Fair	Fair	Oil, Air	1450–1500	1800–1900	53–55	1000–1100	51–43	(d)
H13—Chromium-Molybdenum-VV	Good	Good	Through	Good	Good	Fair	Fair	Air	1400–1450	1825–1875	53–55	1000–1100	51–43	(d)
Tungsten-Base Types														
H21—Tungsten	Good	Good	Through	Good	Good	Fair	Fair	Oil, Air	1500–1550	2100–2150	50–52	950–1150	50–47	(d)
High-Speed Tool Steels														
Tungsten-Base Types														
T1—Tungsten 18-4-1	Good	Good	Through	Poor	Good	Good	Fair	Oil, Air, Salt	1500–1550	2300–2375	63–65	1025–1100	65–63	(d)
T2—Tungsten 18-4-2	Good	Good	Through	Poor	Good	Good	Fair	Oil, Air, Salt	1500–1550	2300–2375	63–65	1025–1100	65–63	(d)
T3—Tungsten 18-4-3	Good	Good	Through	Poor	Good	Best	Fair	Oil, Air, Salt	1500–1550	2300–2375	63–65	1025–1100	65–63	(d)
T4—Cobalt-Tungsten 18-4-1-5	Good	Fair	Through	Poor	Best	Good	Fair	Oil, Air, Salt	1500–1550	2300–2375	63–65	1025–1100	65–63	(d)
T5—Cobalt-Tungsten 18-4-2-8	Good	Fair	Through	Poor	Best	Good	Fair	Oil, Air, Salt	1500–1550	2300–2400	63–65	1050–1100	65–63	(d)
T6—Cobalt-Tungsten 18-4-2-12	Good	Fair	Through	Poor	Best	Good	Fair	Oil, Air, Salt	1500–1550	2300–2400	63–65	1050–1100	65–63	(d)
T8—Cobalt-Tungsten 14-4-2-5	Good	Fair	Through	Poor	Best	Good	Fair	Oil, Air, Salt	1500–1550	2300–2375	63–65	1025–1100	65–63	(d)
Molybdenum-Base Types														
M1—Molybdenum 8-2-1	Good	Fair	Through	Poor	Good	Good	Fair	Oil, Air, Salt	1400–1500	2150–2250	63–65	1025–1050	65–63	(d)
M2—Molybdenum-Tungsten 6-6-2	Good	Fair	Through	Poor	Good	Good	Fair	Oil, Air, Salt	1450–1500	2175–2250	63–65	1025–1075	65–63	(d)
M3—Molybdenum-Tungsten 6-6-3	Good	Fair	Through	Poor	Good	Best	Fair	Oil, Air, Salt	1450–1500	2150–2225	63–65	1025–1075	65–63	(d)
M4—Molybdenum-Tungsten 6-6-4	Good	Fair	Through	Poor	Good	Best	Fair	Oil, Air, Salt	1450–1500	2150–2225	63–65	1025–1075	65–63	(d)
M36—Cobalt-Molybdenum-Tungsten 6-6-2-8	Good	Fair	Through	Poor	Best	Good	Fair	Oil, Air, Salt	1450–1500	2225–2275	63–65	1025–1100	65–63	(d)
Special-Purpose Tool Steels														
Low-Alloy Types														
L6—Nickel-Chromium	Fair	Good	Deep	Fair	Poor	Fair	Fair	Oil	(b)	1500–1600	62–64	400–800	62–48	(c)
L7—Chromium	Fair	Good	Deep	Fair	Poor	Good	Fair	Oil	(b)	1525–1550	63–65	350–500	62–60	(c)

* Toughness decreases somewhat with increasing depth of hardening.

† "W" as shown here indicates water quench. "O" as shown here indicates oil quench.

(a) The purpose of these columns is to show the usual ranges of temperature employed in hardening and tempering and is not to be used as a specification.

(b) For large tools and tools having intricate sections, preheating at 1050 F to 1200 F is recommended.

(c) Use moderately oxidizing atmosphere in furnace or a suitable netural salt bath.

(d) Use protective pack from which volatile matter has been removed, carefully balanced neutral salt bath or atmosphere controlled furnaces. In the latter case, the furnace atmosphere should be in equilibrium with the carbon content of the steel being treated. Furnace atmosphere dew point is considered a reliable method for measuring and controlling this equilibrium.

HINTS ON THE HEAT TREATMENT OF TOOL STEELS

By L. H. Seabright,

Metallurgical Engineer, Acme Steel Co., Chicago

TOOL STEELS should usually be heated slowly to the forging temperature followed by soaking until thoroughly heated through. Preheating to just below the critical point (about 1300°F) is advisable to minimize the danger of rupture. Forging must not be done below the minimum temperature given as rupture of the section will usually occur. Repeated heating is therefore necessary where a large amount of reduction or working is required. As the cross section of a bar is being reduced by forging it is advisable to go from one square section to a smaller square section by knocking the corners down on each reduction. When forging rounds, hexagons, etc., the desired shape should not be forged until the final stage of hot working.

The heating time for the more highly alloyed types, such as high speed and high carbon high chrome, should be about double that for carbon tool steel. Decarburization of the work can be minimized by maintaining a reducing atmosphere.

After forging, the steel should be cooled slowly away from drafts and moisture, preferably in a furnace, ground mica or dry ashes. It is necessary to anneal after forging to remove strains, improve machinability and transform the steel to the proper structure for hardening.

Annealing: Tool steel as received from the mill is fully annealed free from internal stress and of the right structure for efficient machining. Further annealing is only required following forging or in the event of rehardening. Annealing consists of heating the steel slightly above its critical range and cooling very slowly. To prevent decarburization and assure a retarded rate of cooling, pack annealing in iron chip, lime or mica is recommended.

Strain relieving, or subcritical annealing, is recommended to relieve strains set up by heavy machine work or severe cold working. It may be carried out at temperatures slightly below the critical range, such as 1200-1300°F. When warpage must be held to a minimum, strain relieve after rough machining.

Normalizing: Normalizing consists of heating steel to about 125°F above the steel's normal annealing temperature followed by cooling in air. It is desirable only for the carbon and low alloy tool steels, especially with heavy sections.

Hardening: The purpose of hardening tools is to develop the maximum physical properties of the steel, namely tensile or compressive strength and wear resistance. It consists of heating the steel to a temperature well over the critical range followed by rapid cooling in water, oil, or air, whichever is most suitable for the steel being hardened.

Recommended hardening ranges are given for the various types of tool steel in the accompanying table. Steel should be heated slowly and uniformly to the proper hardening temperature. For best results, especially when the dies or tools are of intricate section, they should be preheated before exposure to the hardening temperature. A preheat temperature of 1300°F is generally recommended for water-hardening and oil-hardening steels; a preheat of about 1550°F for high-speed steels. After preheating thoroughly at this temperature, the work should be raised to the specified hardening temperature. The importance of preheating may be realized from consideration of the fact that steels progressively expand up to their critical range, contract through the critical range, and finally expand again from this point up to the hardening temperature. Thus, if the work is heated too rapidly, the smaller sections expand while the larger sections contract or vice versa, resulting in distortion before the work ever leaves the furnace.

A conservative rule to follow after the work appears to have reached the hardening temperature is to soak at heat about 10 min per in. of the maximum work section. Since the high carbon high chromium steels conduct heat only about half as fast as the carbon steels, they must be heated proportionately longer.

In the event neither protective atmosphere nor heating bath is available and it is necessary to preserve the surface, pack hardening is recommend.

This process consists of packing the tools in a container with cast iron chips, spent carburizing compound, or other carbon alloys material, which should be dry and free from dirt and scale. It generally requires about twice as long to bring this charge up to the hardening temperature as for the unpacked work. When the charge is heated through, the tools should be removed quickly and quenched.

Quenching: In quenching tool steel, it is necessary to have sufficient volume of quench to cool the steel and still remain within the proper temperature limits for uniform results. In general, tools should cool down to 150-200°F before removal from the quench. A good rule is to allow them to cool to the point where they can be touched by the hand momentarily without discomfort. The use of air for agitating liquid baths is not recommended because of the insulating action of air bubbles. The most common quenching mediums are water, brine, various oils, fused salt and air.

The water hardening steels (the straight carbon, carbon vanadium, etc.) may be quenched in brine or water for full hardness. Very small sections of these steels may be quenched in oil for greater safety in hardening. Parts quenched in brine will have less adhering scale and be less susceptible to soft spots. A bath temperature of 70-90°F is generally satisfactory for brine quenching. For oil quenching a bath temperature range of 90° to 150°F is used in order to maintain desired viscosity. The accumulation of water in the bottom of oil quenching tanks must be avoided, as it can cause cracked tools.

For greater dimensional accuracy in quenching oil hardening steels, sections of approximately 1-in. or less may be quenched in a fused salt bath. The temperature of the salt bath is maintained near the Ms* point (usually around 400°F or slightly

* The temperature at which the martensite transformation starts to take place and the hardening of the steel begins.

lower). The parts are held at this temperature until they have cooled throughout to the temperature of the quench. They are then cooled in air and tempered to the desired hardness. This also results in improved toughness.

A similar practice for high speed steel tools involves use of a fused salt quench at about 1050°F. quenching to this temperature cools the steel to a point where transformation does not take place. After the steel has reached equilibrium at this temperature, the parts are allowed to cool in air to about 300°F before tempering.

Tempering: Since the quenching operation leaves the parts in a more or less highly strained condition, there is often danger of cracking if hardening strains are not promptly relieved. The best practice is to temper the parts when they reach a temperature of about 150-200°F.

The object of tempering is not only to relieve stresses, but also to bring the parts to the desired operating hardness range. Tempering (often called drawing) consists of reheating the work to a comparatively low temperature, depending on the type of steel and nature of the tool. Average Rockwell hardness figures are given in the preceding tables for the different types of steel at varying temperatures. In general, a long draw at a lower temperature is preferable to a short time at a higher temperature. The time for drawing the lower alloy steels should be at least one hour at heat per inch of thickness.

Tempering of high speed steels is usually done at 950-1100°F, holding at this temperature from 1 to 4 hr, depending on the size of the charge. Double tempering is generally recommended for high speed steel tools to improve toughness.

The surface wear resistance of high speed steel tools may often be increased by nitriding in a molten bath of sodium and potassium cyanides. This is especially suitable for cutting tools taking light cuts on hard or abrasive materials. This treatment may serve as a second draw as it is applied at about 1050°F for ½ to 1 hr after the first draw and grinding of the tools.

TOOL STEEL BRANDS

Descriptive matter following many steels in this edition of the directory has been replaced by an SAE symbol. This actually gives a great deal more information on these brands than former listings. The user need only refer to the tables on the preceding pages to find approximate composition, forging and heat treating data and various physical properties. Steels without SAE symbols are either unclassifiable under the current SAE list or the distributor did not provide enough information to permit classification. Producer and distributor addresses precede the listings.

A

Achorn Steel Co.
381 Congress Street
Boston, Mass.

Ackerlind Steel Co., Inc.
392 W. Broadway
New York 12, N. Y.

Adamas Carbide Corp.
1000 S. 4th Street
Harrison, N. J.

Agawam Tool Co.
77 Napier Street
Springfield, Mass.

Allegheny-Ludlum Steel Corp.
Pittsburgh 22, Pa.
Carbides:
Ferndale, Detroit 20, Mich.

Allied Steel and Chemical Co.
605 West 43rd Street
New York 18, N. Y.

Anchor Drawn Steel Co.
Latrobe, Pa.
Cold drawn division of Vanadium-Alloys Steel Co. Supplies all parent company tool steels in form of drill rod or cold drawn special shapes.

Armstrong Bros. Tool Co.
5209 W. Armstrong Avenue
Chicago 30, Ill.

Associated Steel Co.
4545 Hough Avenue
Cleveland 3, Ohio

Atlantic Steel Corp.
1775 Broadway
New York 19

Atlas Steels, Ltd.
Welland
Ontario, Canada

B

Bedford Tool & Forge Co.
22 Interstate Street
Bedford, Ohio

Bethlehem Steel Co.
Bethlehem, Pa.

Bissett Steel Co.
945 E. 67th Street
Cleveland 3, Ohio

Blackalloy Co. of America
415 Lexington Avenue
New York 17, N. Y.

Bohler Bros. & Co., Ltd.
Vienna 1, Austria
Agents—
Raven Steel & Tool Co., Inc.
525 Stagg St.,
Brooklyn 37, N. Y.

H. Boker & Co., Inc.
101 Duane Street
New York 7, N. Y.

Bowsteel Distributors Corp.
601 E. Linden Avenue
Linden, N. J.

Boyd-Wagner Co.
1440 West Lake Street
Chicago 7, Ill.

Braeburn Alloy Steel Div.
Continental Copper & Steel Industries, Inc.
Braeburn, Pa.

C

Carboloy Dept., General Electric Co.
Box 237
Roosevelt Park Annex
Detroit 32, Mich.

Carpenter Steel Co.
Reading, Pa.

Columbia Tool Steel Co.
Lincoln Highway and State Street
Chicago Heights, Ill.

Copperweld Steel Co.
Warren, Ohio

Coulter Steel & Forge Co.
1498 67th Street
Emeryville, Calif.

Craine-Schrage Steel Div.
Detroit Steel Corp.
13770 Joy Road
Detroit 28, Mich.

Crucible Electric Steel Co.
Homestead, Pa.

Crucible Steel Co. of America
405 Lexington Avenue
New York 17, N. Y.

Continued

D

Darwin & Milner, Inc.
2345 St. Clair Avenue
Cleveland 14, Ohio

Delaware Tool Steel Corp.
Wilmington 99, Delaware

Diehl Steel Co.
236 Broadway
Cincinnati 2, Ohio

Henry Disston & Sons, Inc.
Unruh and Milner
Philadelphia 35, Pa.

DoAll Company
Des Plaines, Ill.

E

Edgcomb Steel Co.
3600 No. "D" Street
Philadelphia 34, Pa.

Erie Steel Co.
403 Greenwich Street
New York 13, N. Y.

F

Faitoute Iron & Steel Co., Inc.
182 Frelinghuysen Avenue
Newark 5, N. J.

A. Finkl & Sons Co.
2011 Southport Avenue
Chicago 14, Ill.

Firth Sterling, Inc.
3113 Forbes St.
Pittsburgh 30, Pa.

G

Gorham Tool Co.
14400 Woodrow Wilson Avenue
Detroit 3, Mich.

Great Western Steel Co., Inc.
Div. of Hoyland Steel Co., Inc.
1011 E. 61st Street
Los Angeles 1, Calif.

Gulf Steel Corp.
8008 S. Chicago Ave.
Chicago 17, Ill.

H

Hawkridge Bros. Co.
303 Congress Street
Boston 10, Mass.

Haynes Stellite Div.
Union Carbide & Carbon Corp.
30 E. 42nd St.
New York 17, N. Y.

Heppenstall Co.
4622 Hatfield Street
Pittsburgh 1, Pa.

Hidalgo Steel Co., Inc.
74 Varick Street
New York 13, N. Y.

Houghton & Richards, Inc.
19 Jersey Street
Boston 15, Mass.

Hoyland Steel Co., Inc.
405 Lexington Avenue
New York 17, N. Y.

J

Jamison Steel Corp.
508 Fourth Street
San Francisco 7, Calif.

Jessop Steel Co.
538 Green Street
Washington, Pa.

Wm. Jessop & Sons, Ltd.
Sheffield, England
Factory representative
George Saratso
702 Penn Avenue
Teaneck, N. J.

K

Kennametal, Inc.
P. O. Box 231
Latrobe, Pa.

Kidd Drawn Steel Co.
Aliquippa, Pa.

Kloster Steel Corp.
224 N. Justine St.
Chicago 7, Ill.

L

Latrobe Steel Co.
Latrobe, Pa.

Lehigh Steel Corp.
Bethune and Greenwich Streets
New York 14, N. Y.

M

Marshall Steel Co.
P. O. Box 108
La Grange, Ill.

McInnes Steel Co.
441 E. Main Street
Corry, Pa.

Meridian Steel Co.
250 W. 57th Street
New York 19, N. Y.

Metal Carbides Corp.
107 E. Indianola Avenue
Youngstown 5, Ohio

A. Milne & Co.
741 Washington Street
New York 14, N. Y.

N

North American Steel Co.
4531 Hough Avenue
Cleveland 13, Ohio

P

Patriarche & Bell
55 Carmine Street
New York 14, N. Y.

Peninsular Steel Co.
1030 McDougall Ave.
Detroit 7, Mich.

Pennsylvania Steel Corp.
12270 Coyle Avenue
Detroit 27, Mich.

Pittsburgh Tool Steel Wire Co.
Monaca, Pa.

Horace T. Potts Co.
E. Erie Avenue and D Street
Philadelphia 34, Pa.

Pyramid Steel Co.
P. O. Box 1226
Cleveland 3, Ohio

R

Raven Steel & Tool Co., Inc.
(See Bohler Bros. & Co., Ltd.)

Republic Steel Corp.
3100 E. 45th Street
Cleveland 4, Ohio

Joseph T. Ryerson & Son, Inc.
16th & Rockwell Streets
Chicago, Ill.

S

Seaboard Steel Co. of America, Inc.
1775 Broadway
New York 19, N. Y.

Simonds Saw & Steel Co.
Ohio Street
Lockport, N. Y.

Stulz Sickles Co.
134 Lafayette Street
Newark 5, N. J.

Swedish-American Steel Corp.
429 Kent Ave.
Brooklyn 11, N. Y.

T

Tennessee Coal, Iron & Railroad Co.
Birmingham 2, Ala.

Timken Roller Bearing Co.
Steel & Tube Div.
Canton 6, Ohio

Tungsten Alloy Mfg. Co.
65 Colden St.
Newark 4, N. J.

U

Uddeholm Co. of America, Inc.
155 East 44th Street
New York 17, N. Y.

Universal-Cyclops Steel Co.
Bridgeville, Pa., and Titusville, Pa.

V

Vanadium-Alloys Steel Co.
Latrobe, Pa.

Vascoloy-Ramet Corp.
800 Market Street
Waukegan, Ill.

Vulcan Crucible Steel Co.
Aliquippa, Pa.

W

Wesson Co.
1220 Woodward Hts. Blvd.
Ferndale, Detroit 20, Mich.

Wetherell Bros. Co.
251 Albany St.
Cambridge 39, Mass.

Wheelock, Lovejoy & Co., Inc.
128 Sidney Street
Cambridge 39, Mass.

Willey's Carbide Tool Co.
1340 W. Vernor Highway
Detroit 1, Mich.

Z

Ziv Steel & Wire Co.
2945 W. Harrison Street
Chicago, Ill.

Tool Steel and Carbide Brands

2B (HC)
A hot work steel, recommended for piercing punches, mandrels, gripper, heading and extrusion dies and rolls for rolling hoes and spades. Contains C 0.48, Mn 0.28, Si 0.30, Cr 2.90, V 0.35, W 11.25. Jessop Steel Co.

2B-L6 **H21**
Jessop Steel Co.

2B (MC)
A hot work steel, adaptable for tools subject to heavy battering action where hardness and considerable toughness are required. Contains C 0.39, Mn 0.30, Si 0.30, Cr 3.00, V 0.35, W 13.50. Jessop Steel Co.

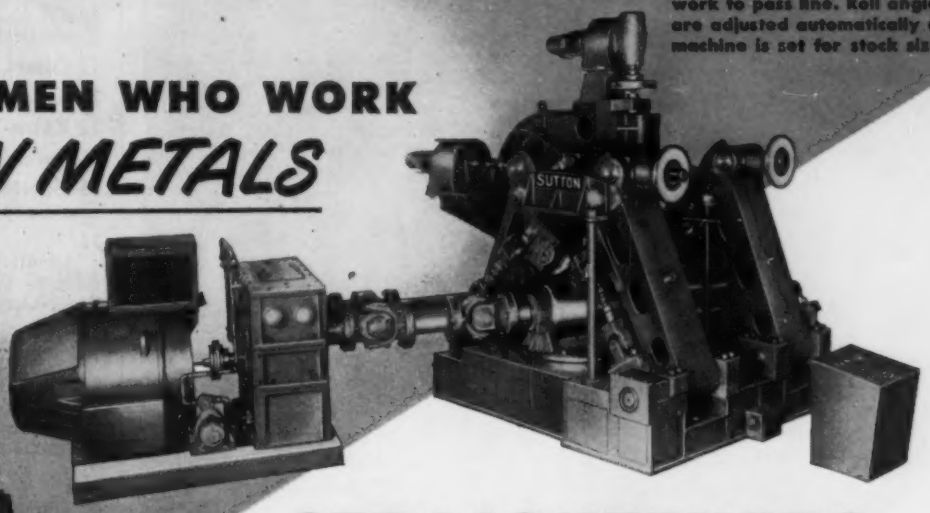
Turn Page

NEW SUTTON SEVEN ROLL STRAIGHTENER

For bars and tubes. Two 3-roll clusters positively confine work to pass line. Roll angles are adjusted automatically as machine is set for stock size.

FOR MEN WHO WORK

IN METALS



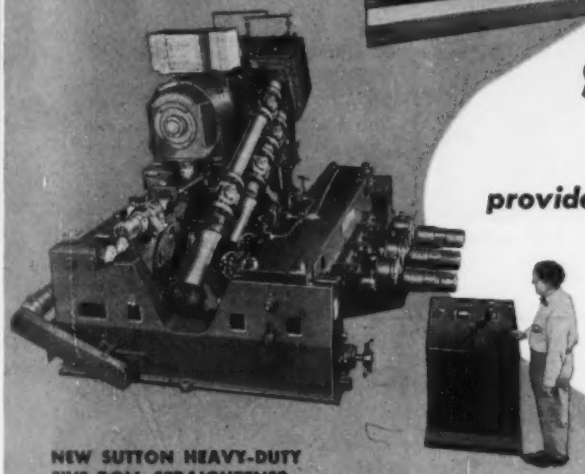
STRAIGHTENERS

BY SUTTON

provide ... SPEED ... PRECISION ... DEPENDABILITY

You get the advantage of our years of specialized experience with every installation. Sutton Straighteners are built in all sizes for bars and tubes from ⅛" to 18" in diameter. They operate at speeds up to 1000 feet per minute.

Ask us for a proposal or for specific information about any straightening need you may have. There is no obligation for this service.

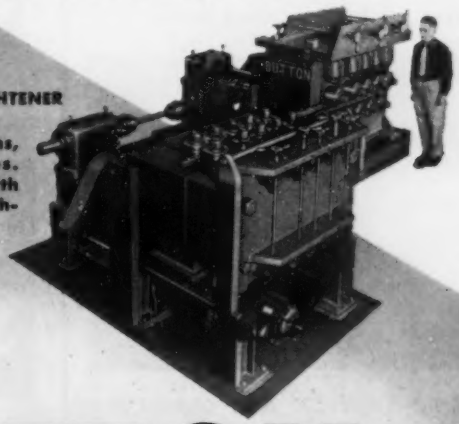


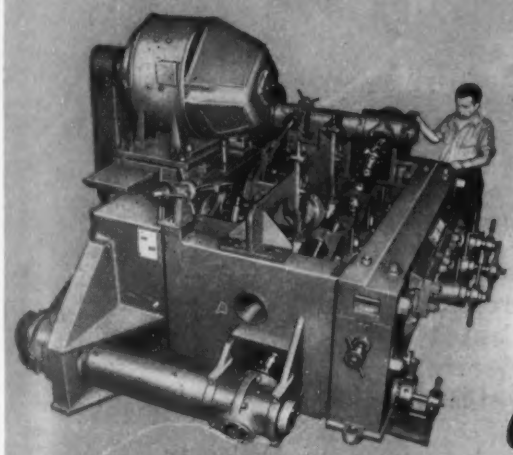
NEW SUTTON HEAVY-DUTY FIVE ROLL STRAIGHTENER

For bars and tubes. Screw-downs and roll angling adjustments are power operated.

NEW SUTTON TWO-PLANE STRAIGHTENER

For flats, squares, hexagons, angles and other shapes. Heavy duty construction with anti-friction bearings throughout.





NEW SUTTON FIVE ROLL STRAIGHTENER AND POLISHER

For cold drawn bars. Has four driven rolls. Exceptionally good for high-speed work.

SUTTON *Engineering* COMPANY

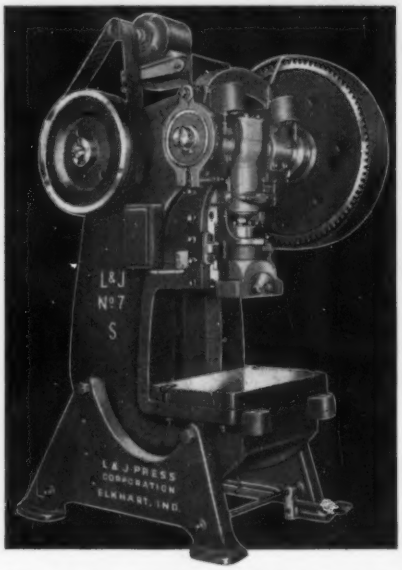
Manufacturers for Ferrous and Non-Ferrous Industries

STRAIGHTENERS, SHEET LEVELLERS, HYDRAULIC STRETCHERS, GAG PRESSES, ROTARY CLEANERS, HEAVY DUTY UNIVERSAL JOINTS, ROLLS

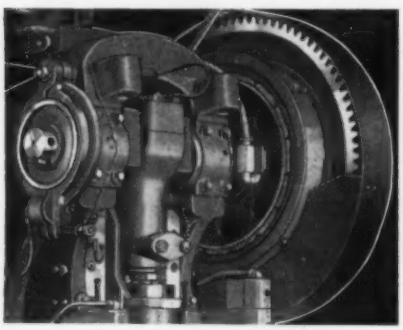
BELLEFONTE, PENNSYLVANIA

L&J PRESSES

for Low-Cost Output



The exceptional rigidity and accuracy built into L & J No. 7 Presses is proven by their productivity. Close tolerance work can be consistently produced, longer die life results from proper alignment and minimum deflection. Reports of users show down time and maintenance surprisingly low. Find out now how these presses can improve the quality and volume of your press work at reduced costs.



L&J FAWICK AIR CLUTCH

This clutch, when used with a variable speed drive, provides maximum speed for each operation. Also, more production and greater safety. L & J Air-Release Spring-Set Brake is positive, fast, safe—sets automatically if air pressure fails.

Write for Literature

L&J PRESS CORPORATION
1623 STERLING AVENUE
ELKHART, INDIANA

—Tool Steels—

Continued

2V72
A water hardening steel for cold work dies. Contains C 0.80, Mn 0.40, V 0.10, Si 0.60. Heppenstall Co.

2V90
A water hardening steel for cold work dies. Contains C .95, Mn .40, V .10, Si .60. Heppenstall Co.

3-C Special D5
Jessop Steel Co.

4 W 1 (1.00 C)
Boyd-Wagner Co.

5H50
An oil hardening steel for hot work does. Contains C 0.55, Mn 0.80, Cr 1.00, Mo 0.45, V 0.08, Si 025 Heppenstall Co.

6H-W
A hot work die steel. Contains C 0.60, Cr 4.00, Mo 0.45, V 0.75. Republic Steel Corp.

6-N-6 M2 M2
Henry Disston & Sons, Inc.

8-N-2 M1
Vanadium Alloys Steel Co.

8-N-2 Cobalt
An 8-1-½-4-1 type molybdenum high speed steel with 5.00 cobalt. Vanadium Alloys Steel Co.

10HW H12
Republic Steel Corp.

11 Comet W1 (1.00 C)

11 Extra W1 (1.00 C)

11 Extra-Vanadium W2 (1.00 C)

11 Special W1 (1.00 C)

11 Special-Vanadium W2 (1.00 C
The Carpenter Steel Co.

14
An alloy steel. Contains C 1.00, Mn 0.35, Si 0.23, Cr 0.45 to 0.50. Kloster Steel Corp.

57HW H21
Bethlehem Steel Co., Inc.

57 Special Hot Work
A tungsten hot work steel, containing C 0.42, Cr 3.50, V 0.30, W 15.00. Bethlehem Steel Co., Inc.

66HS M2

67 Chisel S1
Bethlehem Steel Co., Inc.

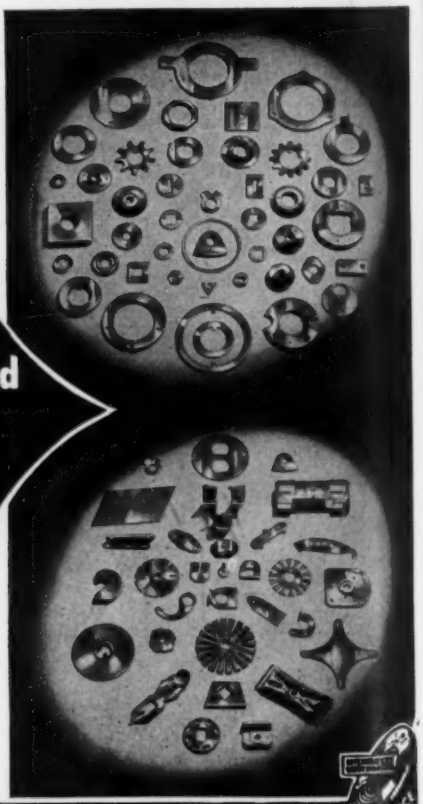
345 H12
The Carpenter Steel Co.

404 D2
Republic Steel Corp.

481 S5

484 A2
The Carpenter Steel Co.

Serving
INDUSTRY
since **1887**



WASHERS and STAMPINGS

Standard and Special Washers, of every description, from every kind of material, any desired finish . . . designed for every purpose . . . utilizing more than 22,000 Sets of Dies.

Let us Quote on Your Needs.

WROUGHT WASHER MFG. CO.
THE WORLD'S LARGEST PRODUCER OF WASHERS
2202 SOUTH BAY STREET • MILWAUKEE 7, WISCONSIN

550
A chromium base hot work tool steel. Contains C 0.45, Mn 0.65, Cr 1.60, Mo 1.10, V 0.25. Republic Steel Corp.

609 S5
Allegheny Ludlum Steel Corp.

610 D2
The Carpenter Steel Co.

812 Die Steel D3
Henry Disston & Sons, Inc.

864 O2
Simonds Saw and Steel Co.

883 H13
The Carpenter Steel Co.

3074 Hot Work H21
A. Milne & Co.

7720
For blanking dies and other operations where high stress is prevalent. Boyd-Wagner Co.

12225 D3
Simonds Saw and Steel Co.

A. C. T.
High speed, oil hardening steel, for heavy duty tools. Contains C 0.65, Mn. 0.15, Si 0.15, Co 10.00, V. 2.00, W 18.00, Mo 0.75. Atlantic Steel Corp.

A-H5 A2
Bethlehem Steel Co., Inc.

A

ALX
A composition of non-ferrous alloys with a cobalt base. Cast-to-shape in the form of turning, boring and facing tools. Contains chromium, tungsten, carbon and boron. Allegheny-Ludlum Steel Corp.

AMC T1
A. Milne & Co.

AO 20 S1
A. Milne & Co.

A.S.A. 8 W2 (0.90 C)
Atlas Steels, Ltd.

A.S.A. 10 W2 (1.00 C)
Atlas Steels, Ltd.

A. S. Duramold B
A hobbing die steel containing C 0.60, Mn 0.25, Si 0.10, Cr 0.90, Mo 0.20, boron added. Ackerlind Steel Co., Inc.

A. S. Hollow Die Steel
Contains C 1.00, Mn 0.45, Si 0.40, Cr 1.50, V 0.20, P 0.020 max, S 0.020 max. Ackerlind Steel Co., Inc.

A. S. Hot Die Steel
Contains C 0.35, Mn 0.25, Si 0.80, Cr 1.25, W 2.50, V 0.20. Ackerlind Steel Co., Inc.

A. S. Special Hobbing Iron
Contains C 0.50, Mn 0.06, Si 0.05, P 0.015, S 0.012. Ackerlind Steel Co., Inc.

A. S. No. 3 S5

A. S. No. 5 A2

A. S. No. 7 S1
Ackerlind Steel Co., Inc.

Turn Page

WELDMENTS
CAN SAVE YOU MONEY!

Acme weldments are replacing castings for leading machinery and equipment manufacturers everywhere because they do a better job at lower cost. Experienced Acme engineers at work with Acme's complete fabrication facilities can give *you* these same advantages . . . Acme's new 24-page, illustrated booklet shows you why. *The Facts about Weldments and Castings* tells you what you should know about their relative strength, rigidity, vibration, design flexibility, and cost . . . facts to help you specify and save. And it's yours for the asking . .

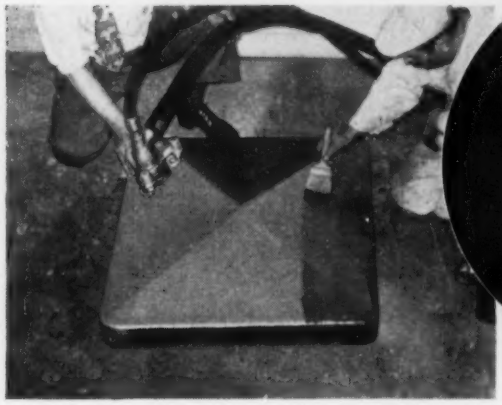
ACME
TANK and WELDING
DIVISION of THE UNITED TOOL & DIE CO.
1079 New Britain Ave. • West Hartford 10, Conn.

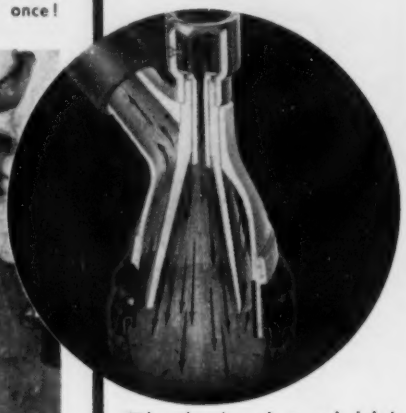
- A.S.M.E. Qualified Welders • National Board Approved
- Hartford Steam Boiler Inspection Service • A.P.I. Approved
- Underwriters Label and Inspection Service • Navy Approved

Write for yours TODAY!

BLAST CLEANING
WITHOUT DUST OR GRIT

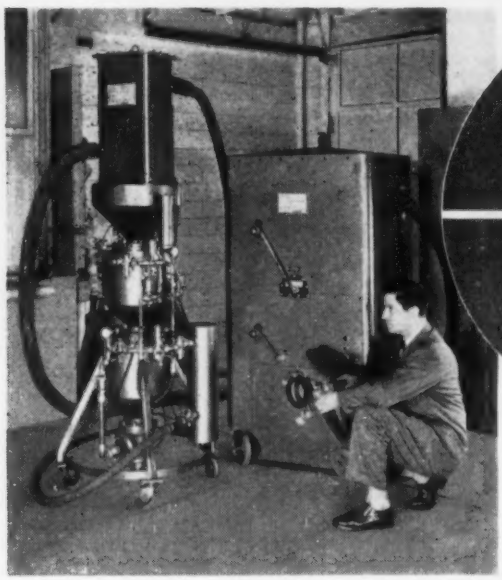
VACU-BLAST scours the surface, eats the dust and reclaims the abrasive — all at once!



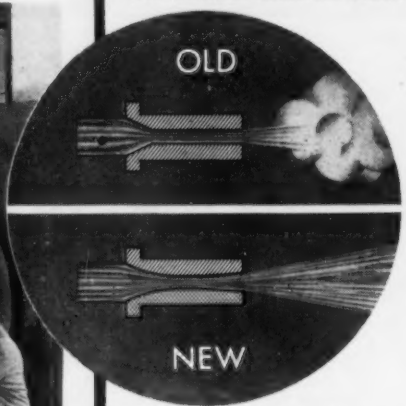


Right in the midst of your working shop, Vacu-Blast removes rust, paint and scale from metal, masonry and wood with a thoroughness and efficiency that only abrasive blasting provides. Surfaces are perfectly prepared for welding, painting or process requirements, yet there's no dust or scattered abrasive to interfere with other operations.

The abrasive, dust and debris are confined within the blast gun — they are picked up by Vacu-Blast's unique, patented vacuum return. The blasted surface is left clean and dustless. Your shop is protected from the nuisance of scattered dust and grit. Valuable abrasive is reused numerous times.



This is Vacu-Blast's working team — the blast gun — the combination generator/reclaimer, and the dust collector. All are compact, portable and easy to move around.



Newest Vacu-Blast improvement is the flared, high efficiency nozzle that does up to 25% more work per hour than previous nozzles. Developed through extensive research, the throat design of this new nozzle eliminates inefficient shock waves, resulting in full power flow of abrasive. This new nozzle is now provided on all Vacu-Blast equipment, and has been made available to all present users.

VACU-BLAST CO. INC.
468 PENINSULAR AVENUE, SAN MATEO, CALIF.

Please send specific detail information applying to the _____ business.
Firm _____
Address _____
Signed _____

Write for free booklet

Tool Steels

Continued

A. S. No. 15
Pressure resisting, oil-hardening steel. Contains C 0.50, Mn 0.60-0.80, Si 0.25, Cr 0.80-1.10, V 0.15. Ackerlind Steel Co., Inc.

A. S. No. 27
High-pressure resisting, water-hardening steel. Contains C 0.95-1.10, Mn 0.30, Si 0.25, Cr 1.50, V 0.10, P 0.015, S 0.012. Ackerlind Steel Co., Inc

A S. No. 42 H21

A. S. No. 66 M2
Ackerlind Steel Co., Inc.

A. S. 121 Air Hardening
An air hardening tool steel containing C 1.00, Mn 2.00, Cr 0.90, Mo 0.90. Ackerlind Steel Co., Inc.

A. S. V. W1 (Gr. 1, 0.80 to 1.20 C)

A. W. Special 17
Firth Sterling, Inc.

Achorn AF-33 Hot Work H12
Achorn Steel Co.

Achorn Best Carbon
Water hardening steel. Contains C 1.05 to 1.15, Mn 0.20. Achorn Steel Co.

Achorn M-2 High Speed M2
Achorn Steel Co.

Achorn Cold Heading
Water hardening steel. Contains C 0.95, Mn 0.30. Achorn Steel Co.

Achorn CVM A2
Achorn Steel Co.

Achorn Extra Blade
Oil hardening steel. Contains C 1.10, Mn 0.25, Cr 0.50. Achorn Steel Co.

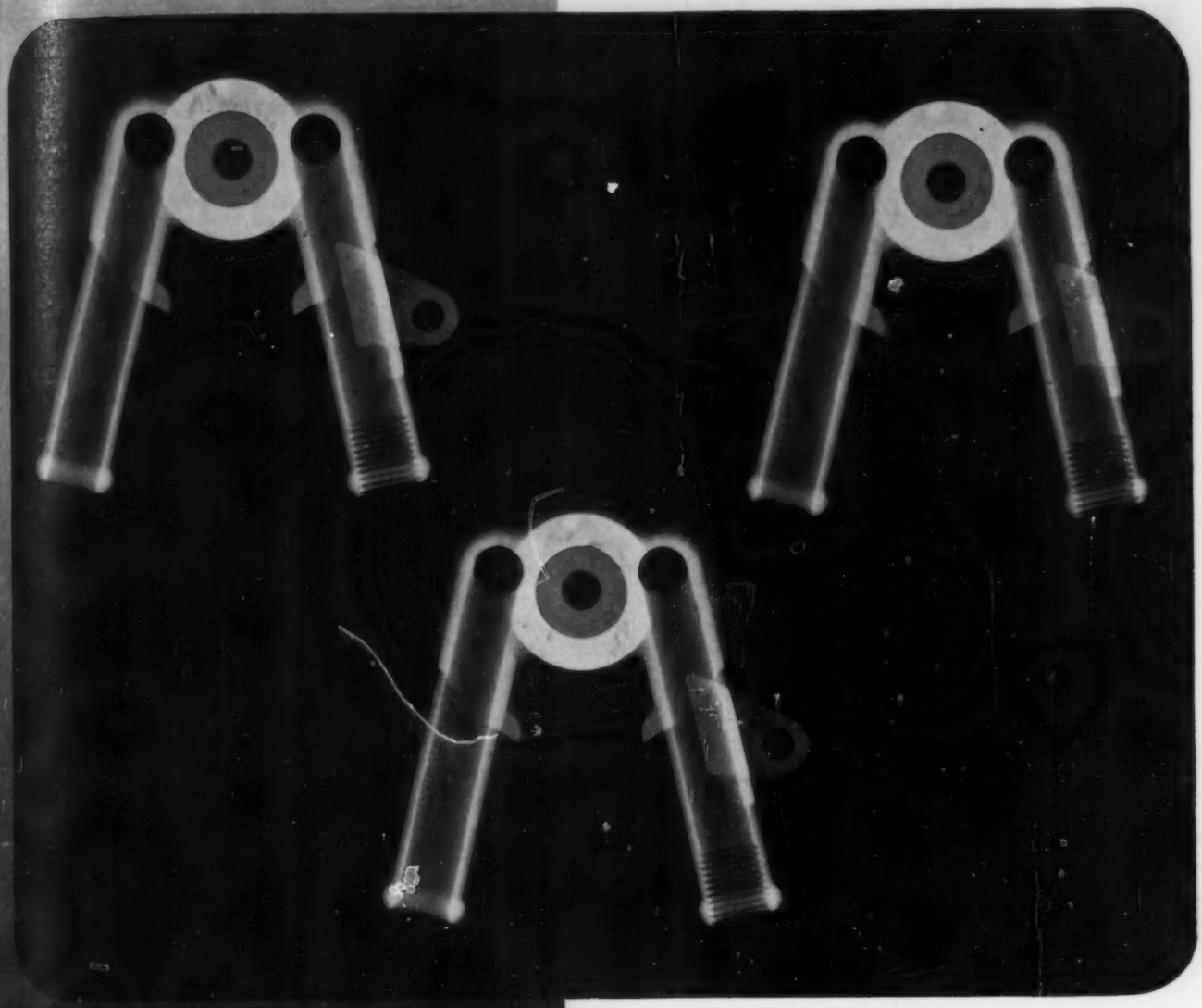
Achorn Extra Carbon
Water hardening steel. Contains C 1.00 to 1.10, Mn 0.25. Achorn Steel Co.

Achorn Extra Solid Drill
Water hardening steel. Contains C 1.15, Mn 0.30. Achorn Steel Co.

Turn to Page 318

"Okay, wise guy, get that truck out of here."

Radiograph of automotive heater shut-off valve.



RADIOGRAPHY
Sets the stage for high yield runs

FOR EXAMPLE, take this automotive heater shut-off valve. Radiographs of pilot castings, made prior to production runs, disclosed a few recurring areas of porosity. A minor change in casting technique brought a higher yield of sound castings.

Cases like this show why more and more progressive suppliers of castings are employing radiography. It leads to sound production quickly, lets them know only high-quality work is released.

If you would like to know how radiography can help you in your operations, discuss it with your x-ray dealer. Or, if you wish, we'll send you a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division • Rochester 4, New York

Radiography...
another important function of photography

Kodak
TRADE-MARK

TO SALVAGE CRACKED CASTINGS

Heat treating welded cracked castings has been simplified by this Holcroft "salvage" annealing furnace.

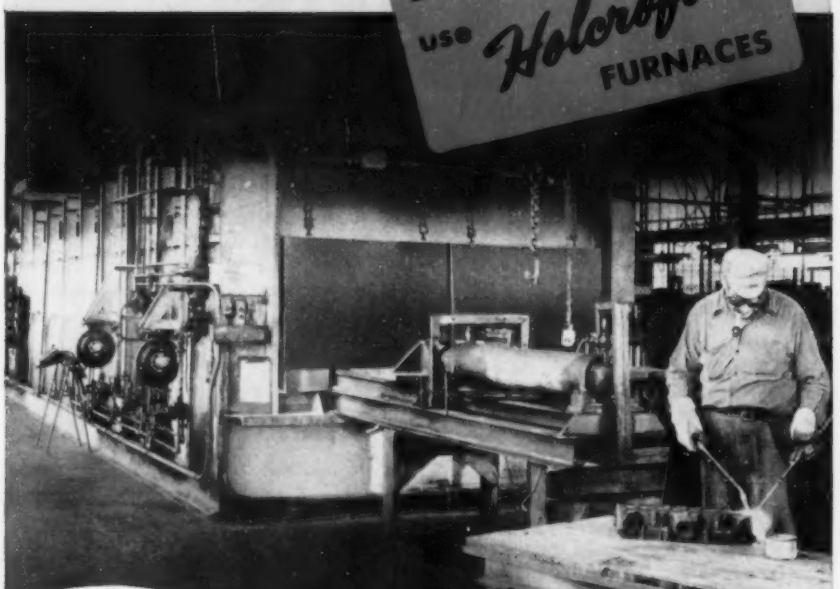
Due to a unique construction feature within the furnace—hot, annealed castings actually pre-heat cold ones entering the furnace.

It is due to such advancements in efficient furnace operation that substantial savings in fuel are realized by owners of Holcroft furnaces. If Holcroft furnaces *do* cost a little more—savings in fuel and extra efficiency soon start paying dividends to the user.

Leading industries throughout the country today look to Holcroft for such modern techniques in their foundry procedures. They know that Holcroft since 1916 has been the heat treat leader.

You, too, can take advantage of this furnace and heat treat experience. We appreciate your inquiries. **Holcroft and Company, 6545 Epworth Blvd., Detroit 10, Michigan.**

LEADING FOUNDRIES use Holcroft FURNACES



BUILT BY HOLCROFT & COMPANY DETROIT · MICH

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO 9 — C. H. Martin, A. A. Engelhardt, 4209 South Western Blvd.
CLEVELAND 15 — Wallace F. Schott, 1900 Euclid Ave.
HOUSTON 1 — R. E. McArdle, 5724 Navigation Blvd.
CANADA — Walker Metal Products, Ltd., Windsor, Ontario
EUROPE — S. O. F. I. M., Paris 8, France

Tool Steels

Continued

Achorn 512
A mold steel containing C 0.08 to 0.12, Mn 0.40 to 0.55, Cr 1.40 to 1.65, Ni 3.25 to 3.75. Achorn Steel Co.

Achorn High Production
Air or oil hardening steel. Contains C 1.60, Cr 12.00, Mo 0.80, V 0.80 to 1.00. Achorn Steel Co.

Achorn High Speed
Standard 18-4-1 and 18-4-2 analyses. Achorn Steel Co.

Achorn Hollow Drill
Water hardening steel. Contains C 0.75, Mn 0.30. Achorn Steel Co.

Achorn Moldalloy (Mold Steel)
Contains C 0.10, Mn 0.50, Ni 1.25, Cr 0.50. Achorn Steel Co.

Achorn Rema Iron (Mold Steel)
Contains C 0.04 to 0.08, Mn 0.21. Achorn Steel Co.

Achorn Solid Drill
Water hardening steel. Contains C 0.85, Mn 0.35. Achorn Steel Co.

Achorn Standard Carbon
Water hardening steel. Contains C 1.00 to 1.10, Mn 0.30. Achorn Steel Co.

Achorn Superior Oilhardening O1
Achorn Steel Co.

Achorn "350" Finishing Steel
Contains C 1.25 to 1.35, W 4.00. Achorn Steel Co.

Achorn V. B. C.
Oil hardening steel. Contains C 0.50, Mn 0.25, Cr 0.90, W 1.25, Mo 0.20. Achorn Steel Co.

Adamas
Brand name of a line of carbides. Adamas Carbide Corp. (See "Carbides" listing at end of this section.)

Aero 12-3 D5
Crucible Steel Co. of America.

Aero 12-3
An air hardening high carbon-high chrome steel for applications where high wear resistance combined with superior cutting ability is wanted; also used for some hot work applications. Contains C 1.40, Mn 0.40, Cr 12.50, Mo 0.75, Co 3.0. Crucible Steel Co. of America.

Air-Chrom
A Cr-Mo air hardening steel. Contains C 1.00, Mn 0.57, Si 0.23, Cr 5.30, Mo 1.00, V 0.26. Kloster Steel Corp.

Air Hard A2
Vanadium-Alloys Steel Co.

Air Hardening No. 30 H21
Republic Steel Corp.

Air Hardening No. 40
A hot work die steel. Contains C 0.45, Cr 3.00, W 13.00, V 0.25. Republic Steel Corp.

Airaloy
A low temperature non-deforming die steel. Contains C 1.00, Mn 2.00, Cr 0.90, Mo 0.90. Republic Steel Corp.

Aircrat
Air hardening precision ground flat stock. Contains C 1.00, Mn 1.30, Si 0.45, Cr 5.00, Mo 0.80, Va 0.20. Marshall Steel Co.

Airdi 150 D2
Crucible Steel Co. of America.

Airkool A2
Crucible Steel Co. of America.

Airloy
Manganese-moly, air hardening die steel. Excellent non-deforming quality. Better toughness and resistance to wear than manganese oil hardening types. Contains C 1.00, Mn 3.00, Cr 1.00, Mo 1.00. Allegheny Ludlum Steel Corp.

Airmo
A low heat air hardening die steel for cold work. Contains C 1.00, Mn 2.00, Cr 1.00, Mo 1.00. Firth Sterling, Inc.

Airque A2
Braeburn Alloy Steel Div.

Airtem A2
Lehigh Steel Corp.

Airtreat A. H. A2
Jamison Steel Corp.

Airtrue 51 A2
Simonds Saw and Steel Co.

Airvan A2
Firth Sterling, Inc.

Ajax W1 (Gr. 4)
Kidd Drawn Steel Co.

Albany
A special alloy steel, containing C 0.75, Cr and V, intended especially for shear blades. Allegheny Ludlum Steel Corp.

Alco M S1
Universal-Cyclops Steel Corp.

Alhead
An alloyed cold heading die steel which retains the case-core relationship of straight carbon tool steels but having higher wear resistance. Contains C 1.00, W 1.50, Co 1.50. Allegheny Ludlum Steel Corp.

Alloy C D3
Wm. Jessop & Sons Ltd.

Alloy 10 S5
Braeburn Alloy Steel Div.

Alpha 8 W1 (0.80 C)
Atlas Steels Ltd.

Alto
A shock-resisting, non-tempering tool steel that is tough and hard. Does not chip or batter easily. Associated Steel Co.

Altoloy
A non-tempering, shock-proof steel for pneumatic tools. Machines freely after annealing. Associated Steel Co.

Alva Extra W2 (Gr. 1 & 2)
Crucible Steel Co. of America.

Amcoh O1
A. Milne & Co.

Amoutun M1
Atlantic Steel Corp.

Amutit S O1
Raven Steel & Tool Co.

Annite No. 1
Wear resisting steel for general production purposes where shock is absent and long life is the primary requirement. Contains C 2.25, Mn 0.30, Si 0.25, Cr 13.00, V 0.20. Bissett Steel Co.

Turn Page

UNITCAST
Works with Industry!

COMPLETE ENGINEERING STAFF
at your service
- METALLURGICAL
- FOUNDRY
- MECHANICAL

5 OUT OF 8
Re-designed!
BY UNITCAST

IS YOUR INDUSTRY REPRESENTED?

UNITCAST sales engineers and technical staff backed with 30 plus years of practical "know how" are daily offering suggestions or advice on casting problems to ASSURE our customers the best. Why not let your problems become OURS to solve.

INDIVIDUAL attention is given to EACH casting from the blue print stage through all phases of production before releasing the pattern for construction. CONSTANT follow up BOTH at Unitcast foundries and in the customer's plant serve to assure the ULTIMATE in complete acceptance of Unitcastings.

It is our desire to be the guardian of your good name. Specify UNITCASTINGS for more consistently TOP QUALITY CASTINGS . . . in less time and at less finished cost.

UNITCAST
Corporation
QUALITY STEEL CASTINGS

Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends.

Write or call today. Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. *In Canada:* Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED

YOU *Can* AVOID DIE COSTS COMPLETELY

On Your Next
STAMPING ORDER

Yes, you can – but it's not *necessarily* the best thing for you.

You want the lowest unit cost – *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method**, with no die cost, does work out best.

Or, it might better be our **Short Run Method**, using economical blanking dies and stock punches.

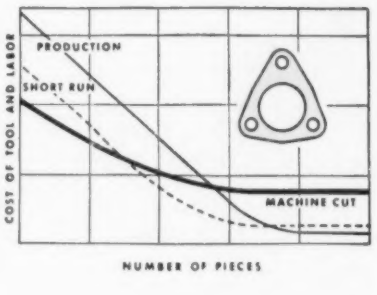
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS — LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



LAMINATED SHIM COMPANY, INC.

Manufacturers of ALL TYPES OF SHIMS

STAMPINGS DIVISION

"ONE PIECE OR ONE MILLION"

STAMPINGS DIVISION, LAMINATED SHIM COMPANY
3201 Union Street, Glenbrook, Conn.

Gentlemen:

Please rush me my free copy of "SERVICE IN STAMPINGS"—the 12-page, illustrated booklet full of helpful facts on the economical buying of stampings.

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

—Tool Steels—

Continued

Annite No. 2
Wear resisting steel for general production purposes. Contains C 1.50, Cr 0.10, Co 1.00, Mo 1.00. Bissett Steel Co.

Apex Drill Rods W1
Lehigh Steel Corp.

Ark Superior T1

Ark Superlative T4
Wm. Jessop & Sons Ltd.

Armaloy
Cast alloy cutter bits and blades with hardness between that of high speed steel and sintered carbide. Armstrong Bros. Tool Co.

Armide
Brand of carbide tool cutters. Armstrong Bros. Tool Co. (See "Carbides" listing at end of this section.)

Armstrong High Speed
A high speed steel. Armstrong Bros. Tool Co.

Arrestite O2
Republic Steel Corp.

Arrow O1
Boyd-Wagner Co.

Atha Pneu S1
Crucible Steel Co. of America.

Atlan O1

Atlan HCC D2
Atlantic Steel Corp.

Atlantic 33
A non-tempering, water hardening steel, for cold chisels, punches, blacksmith tools, rivet sets, pneumatic tools, high temperature resisting bars for all hot work, star drills. Contains C 0.33, Mn 0.40, Si 0.65, Cr 0.75, Mo 0.75, Cu 0.75. Atlantic Steel Corp.

Atlantic 44
A non-tempering, oil hardening steel, for dies, shear blades, rivet sets, pneumatic tools, etc. Contains C 0.44, Mn 0.40, Si 0.65, Cr 0.75, Mo 0.75, Cu 0.75. Atlantic Steel Corp.

Atlantic C T4

Atlantic Die L6

Atlantic H. S. T1

Atlantic Standard W1

Atlantic V T2
Atlantic Steel Corp.

Atlas 93
Chrome-moly, oil hardening shock resisting steel, for leather and fabric cutting dies, wood working tools, etc. Moderate hardness with fair toughness. Contains C 0.55, Mn 0.55, Cr 0.65, Mo 0.35. Allegheny Ludlum Steel Corp.

Atlas A H21
Allegheny Ludlum Steel Corp.

Atlas B
General purpose, tungsten hot work, air or oil hardening steel for copper and brass forging dies, hot forming dies, swedging dies, etc. Good resistance to heat with fair toughness. Contains C 0.40, Cr 3.00, V 0.45, W 12.00 Allegheny Ludlum Steel Corp.

Atlas Q
A special water hardening steel, containing Cr. Atlas Steels, Ltd.

Turn to Page 323

Tool Steels

Continued

Atlas Refined 10
Plain carbon steels, containing C 0.80 to 1.00. Atlas Steels, Ltd.

Atlas Special Alloy 8-10
A special alloy steel, containing V. Atlas Steels, Ltd.

Atlas Triple Extra
A special alloy steel, containing W and Cr. Atlas Steels, Ltd.

Atloy Z
Special purpose electric furnace steel. Contains C 0.33, Mn 0.44, Si 0.50, Cr 1.00, Mo 0.20, Cu 0.35. Atlantic Steel Corp.

Atmodie D2
Columbia Tool Steel Co.

Atsco W1
Atlantic Steel Corp.

Atsco A.R.
An electric furnace steel designed to withstand abrasion and maintain a keen cutting edge against extra hard surfaces. Contains C 0.35, Mn 0.60, Si 0.60, Cr 1.10, Mo 0.20. Atlantic Steel Corp.

Atsco Extra W1

Atsco Special W2

Atsil S5
Atlantic Steel Corp.

B

B6 T1

B7 T4

B8 T8

B9 T2

B10 T5

B44J H21
Universal-Cyclops Steel Corp.

B-47
A tungsten, chromium, cobalt hot work steel which has good red hardness, good toughness and good abrasion resistance. Used for brass extrusion dies and dummy blocks, forging die inserts and hot punches. Contains C 0.40, W 4.25, Cr 4.25, V 2.00, Co 4.25. Allegheny Ludlum Steel Corp.

B. D. C.
A tungsten base hot work tool steel containing W 12.00 and Cr 12.00. Firth Sterling Inc.

B-F High Speed T1
Republic Steel Corp.

Badger
A special alloy steel, containing Cr and W. Atlas Steels, Ltd.

Badger O1
Latrobe Steel Co.

Beacon W-1
Edgcomb Steel Co.

Bedco S5
Bedford Tool & Forge Co.

Berkshire
A high carbon, tungsten tap steel. Contains C 1.20, W 1.35. Carpenter Steel Co.

Best W1
Henry Disston & Sons, Inc.

Best W1 (1.00 C)
Boyd-Wagner Co.

Best W1 (Gr .1, 0.80 to 1.20 C)
Firth Sterling Inc.

Turn Page

✓ check the price

✓ check the analysis

✓ check the performance

and you'll specify

MUELLER BRASS CO.

tuf-stuf®

aluminum bronze

check the price—TUF-STUF, the Mueller Brass Co. series of aluminum bronze alloys, can be supplied at prices below those of similar alloys. Whether you buy TUF-STUF in rod shapes, forgings or screw machine products you'll save money because these alloys are priced right, machine better and last longer.

check the analysis—TUF-STUF alloys are a high copper base series containing from 9% to 13% aluminum and varying amounts of iron, nickel and manganese. They do not contain zinc and, therefore, are not subject to dezincification. TUF-STUF alloys are available in several grades with a chemical composition, suitable hardness and mechanical properties for many different applications.

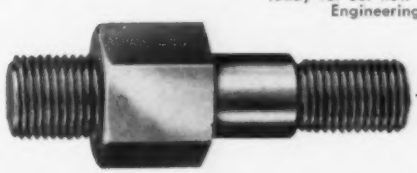
check the performance—TUF-STUF alloys are light and strong—about 8% lighter than cast bronze and almost as strong as steel. They have a low coefficient of friction as well as good bearing and mechanical properties. They not only retain these properties but resist oxidation at the high speeds and high temperatures of modern production equipment. They will withstand strong acid attack or the effects of brackish waters and are highly resistant to corrosion.

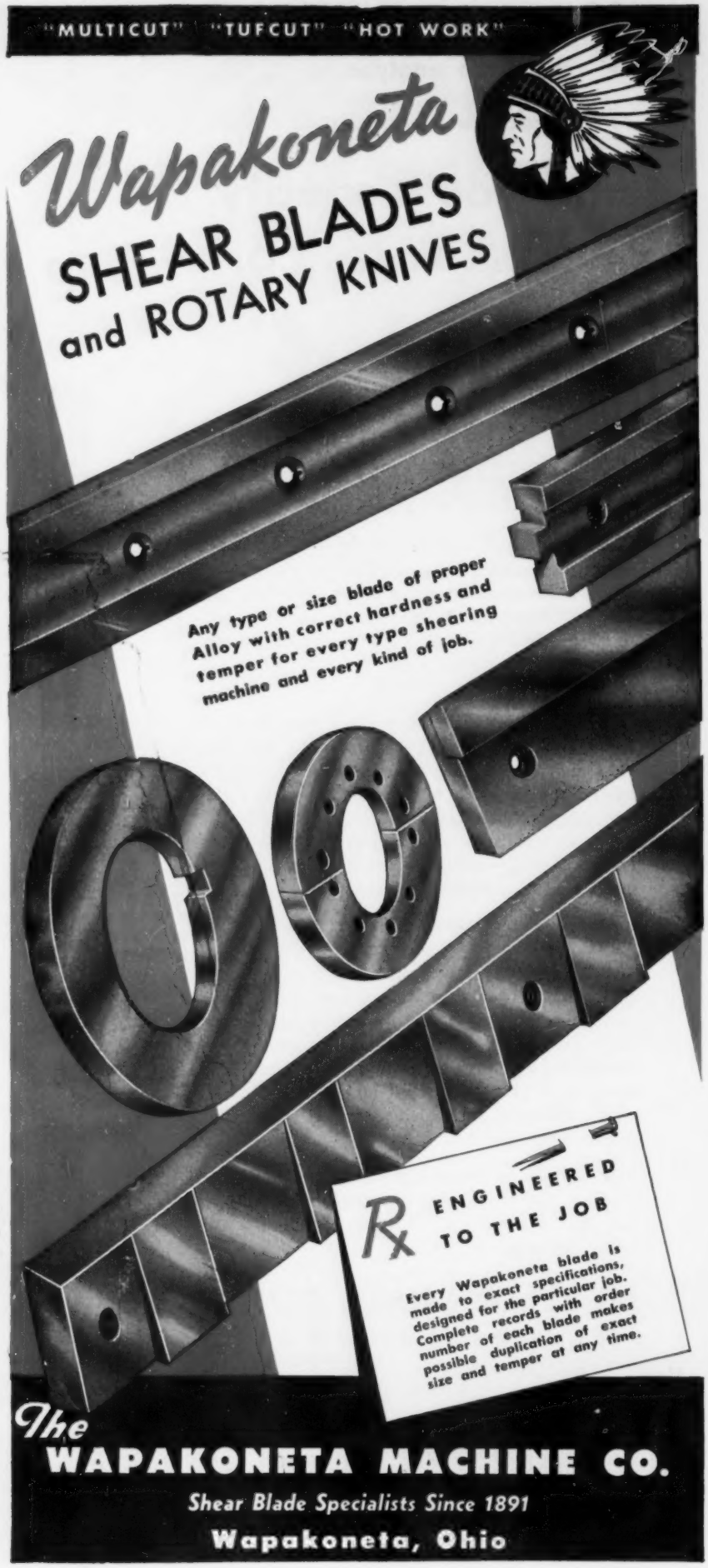
These alloys can be hot-forged into relatively intricate shapes . . . need little or no machining . . . and the smooth, bright surfaces eliminate costly finishing.

MUELLER BRASS CO.

PORT HURON 24, MICHIGAN

For complete information, write today for our new TUF-STUF Engineering Manual.




"MULTICUT" "TUFCUT" "HOT WORK"
Wapakoneta
SHEAR BLADES
and ROTARY KNIVES
Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.
TOOL
Rx ENGINEERED TO THE JOB
Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.
The WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
Wapakoneta, Ohio

Tool Steels

Continued

Best and Superior W2
Bethlehem Steel Co., Inc.

Best Vatool W2
Henry Disston & Sons, Inc.

Beth. M-10
An 8-4-2 molybdenum high speed steel. Bethlehem Steel Co., Inc.

BFS
A carbon-tungsten special purpose steel. Bethlehem Steel Co., Inc.

Black-Diamond W1 (Gr 3)
Crucible Steel Co. of America

Black Label W1 (Gr. 4)
Wm. Jessop & Sons Ltd.

Black Label
A water hardening steel for punches, blanking dies, etc. Contains C 1.05, Mn 0.30, Si 0.24, Cr 0.56. Peninsular Steel Co.

Blackalloy
A non-ferrous centrifugally cast tool composed mainly of Co, Cr, W, Cb. Used for turning, facing and boring and all machining operations on stainless steel, Monel and all hard steels in general. Extremely tough with the same hardness as hardened high speed steel. Blackalloy Co. of America.

Blue Chip T1
Firth Sterling Inc.

Blue Label
A water hardening steel for drawing dies and tools, forming dies, etc. Contains C 1.06, Mn 0.28, Si 0.23, V 0.22. Peninsular Steel Co.

Blue Label W1 (1.00 C)
Ackerlind Steel Co., Inc.

Blue Label W1 (Gr. 3)
Wm. Jessop & Sons, Ltd.

Blue Label W1-W3 (Gr. 2)
Simonds Saw and Steel Co.

Blue Streak T1
(high speed)
The Diehl Steel Co.

Bohler Amutit S
An oil hardening non-shrinking steel for threading and tapping tools. Contains C 0.95, Mn 1.00, Si 0.20, Cr 0.50, W 0.50, V 0.10. Raven Steel & Tool Co.

Bohler 3-Star Special Very Hard
A water hardening, special purpose steel for fast finishing, employing very light cuts, rifling tools, etc. Contains C 1.45, Mn 0.30, Si 0.20, Cr 0.30, W 3.30, V 0.25.

Boker 847 M1

Boker Hot-Work Die Steel H21

Boker Power Chisel Steel S1
H. Boker & Co., Inc.

Bonded Carbide Jr. T5

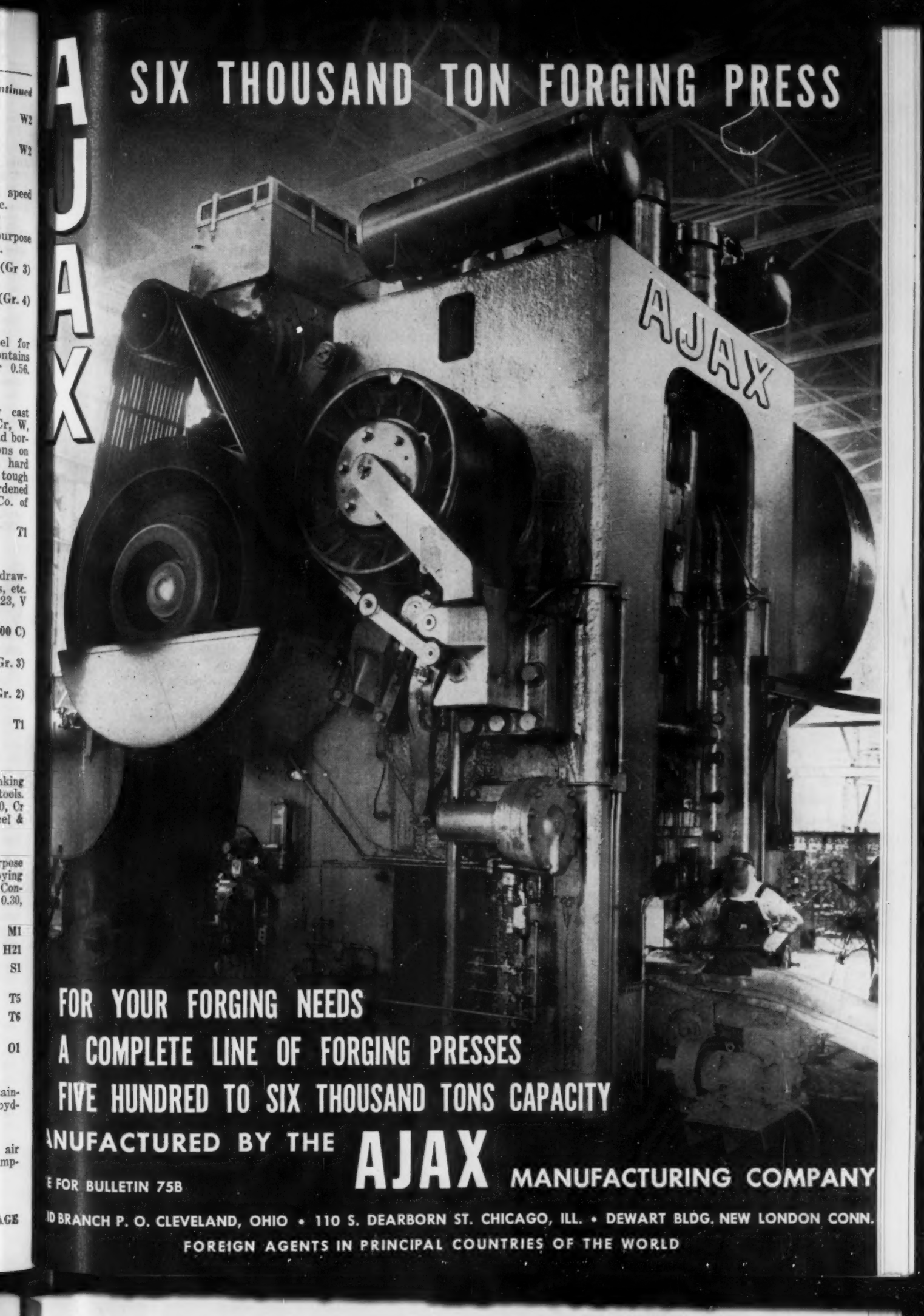
Bonded Carbide Sr. T6
Braeburn Alloy Steel Div.

Bowco O1
Boyd-Wagner Co.

Bowco One Star
A tungsten high speed steel containing Cr 4.00, W 14.00 and V 2.00. Boyd-Wagner Co.

BR-4
High vanadium-high chromium air hardening die steel for shaving, stamp-

Turn to Page 326


AJAX
SIX THOUSAND TON FORGING PRESS
AJAX
FOR YOUR FORGING NEEDS
A COMPLETE LINE OF FORGING PRESSES
FIVE HUNDRED TO SIX THOUSAND TONS CAPACITY
ANUFACTURED BY THE AJAX MANUFACTURING COMPANY
E FOR BULLETIN 75B
D BRANCH P. O. CLEVELAND, OHIO • 110 S. DEARBORN ST. CHICAGO, ILL. • DEWART BLDG. NEW LONDON CONN.
FOREIGN AGENTS IN PRINCIPAL COUNTRIES OF THE WORLD

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS

You'll do better

WITH SHENANGO

CENTRIFUGALLY CAST PARTS

HERE'S WHY . . . Shenango centrifugally cast parts offer many inherent advantages that can help you avoid trouble and save time and money.

For example, due to the centrifugal casting action, you get a more uniform, pressure-dense metal, free from sand inclusions, blow holes and other often-hidden defects. You get higher strength, greater wear resistance, better elongation—longer lasting parts, better able to withstand severe service of *any* kind.

So if your plans call for symmetrical shapes, anywhere from tiny bushings to huge rolls, ferrous or non-ferrous, rough or finished, check with Shenango. Company after company finds it a good way to do a better job at lower cost.

SHENANGO-PENN MOLD COMPANY
Centrifugal Castings Division
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL

Tool Steels

Continued

ing and deep drawing dies. Has extremely high wear resistance and is also non-deforming. Contains C 2.40, Mn 0.40, Si 0.40, Cr 12.75, V 4.00, Mo 1.10. Latrobe Steel Co.

Braemow M2

Braevan M3
Braeburn Alloy Steel Div.

Brilliant M M M4

Brilliant W W T1
Swedish-American Steel Corp.

Brown Label
A fatigue resisting, oil hardening steel for hot and cold header dies, hobs, pneumatic tools, etc. Contains C 0.50, Mn 0.30, Si 0.75, Cr 1.15, W 2.50, V 0.20. Peninsular Steel Co.

Brownie Extra W1 (0.80 C)
Raven Steel & Tool Co.

BTR O1
Bethlehem Steel Co., Inc.

Bulldog S1
Pennsylvania Steel Corp.

Buster Alloy S1
Columbia Tool Steel Co.

C

C55
An oil hardening steel for hot work dies. Contains C 0.55, Mn 0.50, Cr 0.90, Mo 0.30, Si 0.25, Ni 1.50. Heppenstall Co.

C57
An oil, air hardening steel for hot work dies. Contains C 0.55, Mn 0.60, Cr 1.00, Mo 0.75, Si 0.60, Ni 2.15. Heppenstall Co.

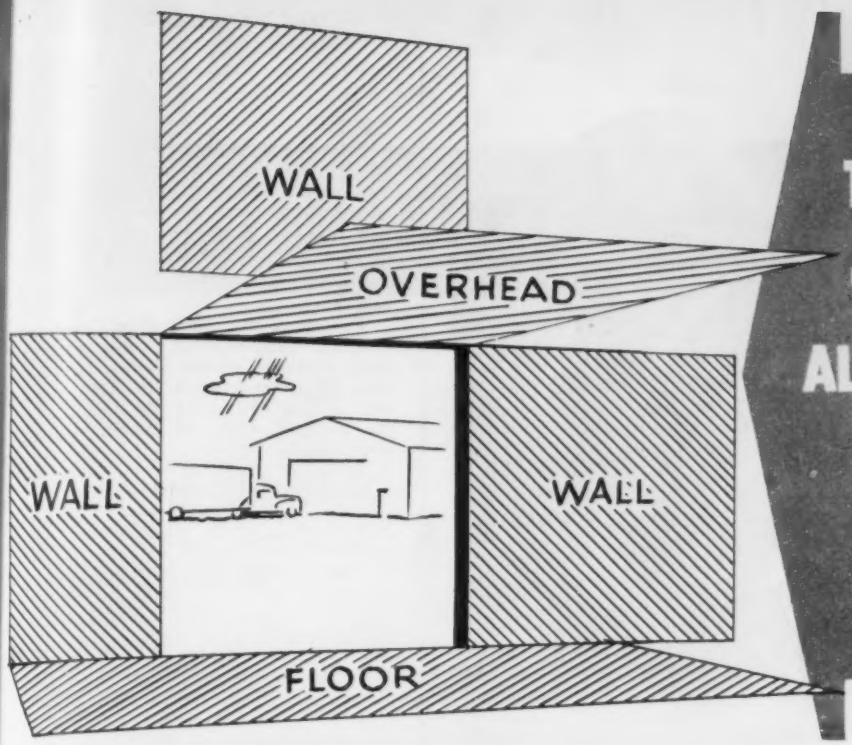
"C" Anneal
An oil hardening steel for hot work dies. Contains C 0.55, Mn 0.80, Cr 1.00, Mo 0.45, V 0.08, Si 0.25. Heppenstall Co.

C. C. S. Die Casting
An oil-hardening or air-hardening steel, for aluminum and brass die casting. Contains C 0.35, Mn 0.35, Si 1.15, Cr 5.25, Co 0.40, W 4.25. Hawkridge Bros. Co.

C. E. C. Impact S5
Columbia Tool Steel Co.

Turn to Page 328

"Well, there's our answer."



The only type of door that makes ALL THESE SPACES FULLY USABLE AT ALL TIMES

KINNEAR Rolling Doors

In addition to many other advantages *proved through more than fifty years of leadership,* you get extra usable space when you install Kinnear Rolling Doors. And with building costs at today's high levels, space economy is more important than ever—whether you need more room now or plan for it tomorrow.

By opening straight upward and coiling into a small space above the lintel, they need no room *inside or outside the building* for opening and closing action.

All ceiling space remains clear for overhead crane or hoist equipment, conveyor lines, ductwork, ceiling-high storage, lighting fixtures or other future needs.

Partitions, storage racks, or other construction can be installed right up to the door jambs on both sides of Kinnear Steel Rolling Doors.

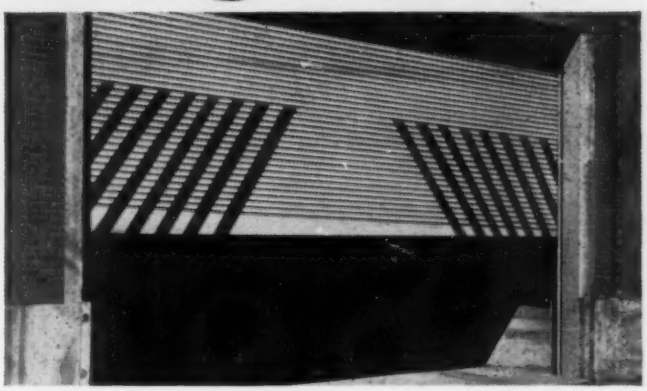
Full benefits of light and visibility are assured at all times, from windows placed close on either side or above Kinnear Rolling Doors. Light from overhead fixtures is never blocked off.

Trucks or other vehicles can stop or park within an inch or two of the door curtain, *inside and outside the building,* without interfering with door operation in any way.

Headroom above Kinnear Rolling Doors need be no greater than the compactly coiled curtain and hood. Or the coil can be mounted on the building exterior where ceiling-high doors are desired.

Other Kinnear *advantages may be even more important in your case. For example:*

Kinnear Rolling Doors clear the entire opening, from jamb to jamb—no projecting edges or mechanism to handicap traffic.



Kinnear's strong, interlocking steel slats give extra protection against fire, theft, intrusion, wind, weather, and accidental damage.

Coiling upward action of Kinnear Rolling Doors is ideal for motor operation, with push-button controls at any desired locations.

The rugged all-metal construction of Kinnear Rolling Doors lasts longer, requires less maintenance, saves money in the long run. If accidentally damaged, slats can be individually replaced *at any time.* Records of 30, 40 and even 50 years of continuous, daily service are reported by many users.

Kinnear Rolling Doors are built any size, for easy installation in old or new buildings. Write today for complete information.

Write for this new Kinnear Catalog today!

The KINNEAR Manufacturing Co.

1760-80 Fields Ave. Columbus 16, Ohio

1742 Yosemite Ave. San Francisco 24, Calif.

SAVING WAYS in DOORWAYS

KINNEAR ROLLING DOORS

Electro
TRADE MARK
SINCE 1919
Specific Purpose
Grinding Wheels
If your present practices cost you too much for the cutters or wheels, as well as in operating time and rejects, we'll gladly send a qualified Field Sales Engineer to see whether our Electro Specific Purpose Grinding Wheels will eliminate these enemies of economy and efficiency for you, just as they have for so many other high-efficiency operators in so many divisions of the metal-working industries. Phone, write or wire. We'll get a man to you quick.
Electro Refractories & Abrasives Corporation
344 DELAWARE AVENUE • BUFFALO 2, NEW YORK
Regional Warehouse: Los Angeles 58, Cal.
Plants: Buffalo, N. Y. – Cap-de-la-Madeleine, P. Q. Canada
K-439

—Tool Steels—

Continued

C.F.S.
Water hardening, low chrome die steel, for dies, drills, mandrels, punches, reamers, taps, etc. Contains carbon in several tempers Cr 0.50, Mn 0.30, Si 0.20. Latrobe Steel Co.

C. H. Q. W1 (Gr. 2, 0.80 to 1.20C)
Firth Sterling Inc.

C.H.W.
Tungsten hot work steel, for brass forging dies, blanking dies, drawing dies, punches, shear blades, trimming dies. Has resistance to heat checking. Contains C 0.50, Mn 0.30, Si 0.25, Cr 2.75, V 0.50, W 15.00. Latrobe Steel Co.

C. L. W. H21
Latrobe Steel Co.

C M V H11

C M W H12
A. Milne & Co.

C N MO
A Ni-Cr-Mo steel for severe service machinery forging applications ranging from 25 to 50,000 lb. For high tensile and ductile forgings. A Finkl & Sons Co.

C-V S1
Republic Steel Corp.

C. Y. W. Choice
Hot work steel for hot forming bull dies and pressure dies. Resists heavy pressure and may be water cooled. Contains C 0.95, Cr 3.75, Mn 0.50. Firth Sterling, Inc.

Calumet
Low temperature air hardening steel. Contains C 1.00, Mn 2.00, Cr 0.90, Mo 0.90. Gulf Steel Corp.

Cannon T1

Cannon Special T2
Darwin & Milner, Inc.

Carbo Tool
Carbon die steel. Contains C 1.00. Bissett Steel Co.

Carboloy
Brand name of a line of carbides. Carboloy Dept., General Electric Co.
(See "Carbides" section Jan. 8, 1953, issue.)

Carbon W1
Faitoute Iron & Steel Co., Inc.

Carbon W1
Wm. Jessop & Sons Ltd.

Carbon W1
Latrobe Steel Co.

Carbon-V W2
Wm. Jessop & Sons Ltd.

Carbon Van W2
Latrobe Steel Co.

Carmet
Brand name of a line of carbides. Allegheny Ludlum Steel Corp.
(See "Carbides" listing Jan. 8, 1953, issue.)

Caroga
A special alloy steel, containing Carbon 0.50, Cr and V. Allegheny Ludlum Steel Corp.

Castide H11
Columbia Tool Steel Co.

Cava W2 (1.00 C)
Boyd-Wagner Co.

CC T5
Raven Steel & Tool Co.

CCM D2
Simonds Saw and Steel Co.

Turn to Page 330

FOR BETTER FORGINGS THAT COST LESS

Although they demand less skill and less manual effort from the operator, Clearing forging presses turn out more pieces per hour than old-fashioned methods. The forgings are uniform in size and weight regardless of the human element.

If you're looking for ways to reduce forging costs or increase production without increasing man-hours, Clearing forging presses are your answer. We'll be glad to supply details without obligation to you.

CLEARING MACHINE CORPORATION

6490 WEST 65TH STREET • CHICAGO 38, ILLINOIS

HAMILTON DIVISION—HAMILTON, OHIO

SEND FOR THIS BULLETIN

Cut-away illustrations show why Clearing forging presses give long, dependable service on the tough jobs. Ask for your free copy.

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

AMERICAN CHEMICAL PAINT COMPANY

AMBLER ACP PENNA.

Technical Service Data Sheet

Subject: INDEX OF ACP CHEMICALS FOR METAL PRESERVATION AND PAINT PROTECTION

METAL	OPERATION	ACP CHEMICAL
ALUMINUM	*Cleaning*	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Preparation for Painting	"ALODINE" "DURIDINE" "DEOXIDINE"
	Protection from Corrosion	"ALODINE"
BRASS	*Brightening*	"ACP BRIGHT DIP"
	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "CUPROTEK
	Corrosion Prevention	"CUPROTEK"
	Soldering Flux	"FLOSOL"
COPPER, BERYLLIUM, AND COPPER ALLOYS	*Brightening*	"ACP BRIGHT DIP"
	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "CUPROTEK"
	Coating Steel with Copper	"CUPRODINE"
	Corrosion Prevention	"CUPROTEK"
	Scale Modification	"RIDOXINE"
	Soldering Flux	"FLOSOL"
	Stripping Copper Coatings	"ACP COPPER STRIPPING SOLUTION"
GALVANIZED IRON, ZINC, AND CADMIUM	*Cleaning*	"DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Corrosion Proofing	"ZINODINE"
	Paint Bonding	"ZINODINE"
	Phosphate Coating, in Preparation for Painting	"LITHOFORM"
	Soldering Flux	"FLOSOL"
IRON AND STEEL	*Chromate Coating, in Preparation for Painting*	"CROMODINE"
	Cleaning	"ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "DURIDINE"
	Coating with Copper	"CUPRODINE"
	Drawing and Extrusion	"GRANODRAW"
	Paint Bonding	"CROMODINE" "DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Paint Stripping	"CAUSTIC SODA AND SOLVENT NO. 3"
	Phosphate Coating, in Preparation for Painting	"DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Phosphate Coating, to Protect Friction Surfaces	"THERMOIL-GRANODINE"
	Pickling with Inhibited Acids	"RODINE"
	Rust Prevention for Unpainted Iron	"PEROLINE"
	Rust Proofing	"PERMADINE" "THERMOIL-GRANODINE"
	Rust Removal—Brush, Dip, or Spray	"DEOXIDINE"
	Soldering Flux	"FLOSOL"
MAGNESIUM	*Cleaning*	"DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Pickling	"RODINE (M-200)"
STAINLESS STEEL	*Cleaning*	"DEOXIDINE"
	Coating with Copper	"CUPRODINE"
	Pickle Polishing	"RODINE"
	Soldering Flux	"FLOSOL"

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDERS ON THE ABOVE CHEMICALS AND FOR INFORMATION ON YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

Tool Steels

Continued

Cello Vanadium
Oil hardening, non-deforming steel, for dies, taps, reamers, hobs, broaches. Contains C 0.90, Mn 1.20, Si 0.35, Cr 0.50, V 0.10 to 0.20, W 0.50. McInnes Steel Co.

Champaloy L6

Champion Non-Changeable O1
Crucible Steel Co. of America

Checkno
Hot work steel. Contains C 0.40, Cr 3.50, V 1.00, W 6.00 to 10.00. Bissett Steel Co.

Chimo S5
Firth Sterling, Inc.

Chiz-Alloy
A special alloy steel, containing C 0.45, Mn 0.30, Si 0.90, Cr 1.00 to 1.25, W 2.50. Kloster Steel Corp.

Chro-Mow H12
Crucible Steel Co. of America

Chromdie D2

Chromdie D2
Faitoute Iron & Steel Co., Inc.

Circle "C" T5

Circle "M" M36
Firth Sterling Inc.

Clarite T1
Columbia Tool Steel Co.

Clipper
A high speed steel. Contains C 0.55 to 0.75, Mn 0.15 to 0.35, Si 0.20 to 0.35, Cr 3.80 to 4.25, W 17.75 to 18.50, V 0.90 to 1.25. Kloster Steel Corp.

CNS-1 D2

CNS-2 D3
Jessop Steel Co

Cobalt
A high speed steel. Contains C 0.72 to 0.80, Mn 0.25 to 0.30, Si 0.20 to 0.30, Cr 4.00 to 4.50, W 13.75 to 14.75, Mo 0.40 to 0.60, V 2.00 to 2.50, Co 4.75 to 5.25. Kloster Steel Corp.

Cobalt T4
Braeburn Alloy Steel Div.

Cobalt Chrome D5
Latrobe Steel Co.

Cobalt Magnet 37%
A permanent magnet steel containing C 0.90, Cr 4.25, W 2.25, and Co 37.00 to 40.00. Latrobe Steel Co.

Coldhot
A special high carbon Cr-Ni-Mo steel for hot and cold trimming of forgings. Also for cutlery die applications. Annealed. A. Finkl & Sons Co.

Colhed W3
Vanadium-Alloys Steel Co.

Colonial No. 4
Water-hardening dies and finishing steel. Contains C 1.30, W 3.50. Colonial Steel Div., Vanadium-Alloys Co.

Colonial No. 6 O1

Colonial No. 7 W2

Colonial No. 14 W1
Vanadium-Alloys Steel Co.

Colosso
Water hardening steel, for chisels, shear blades, punches, etc. No drawing of temper. Contains C 0.30, Mn 0.65, Si 0.65, Cr 0.30, Ni 0.50, V 0.10, W 0.30, Mo 0.60. Hidalgo Steel Co.

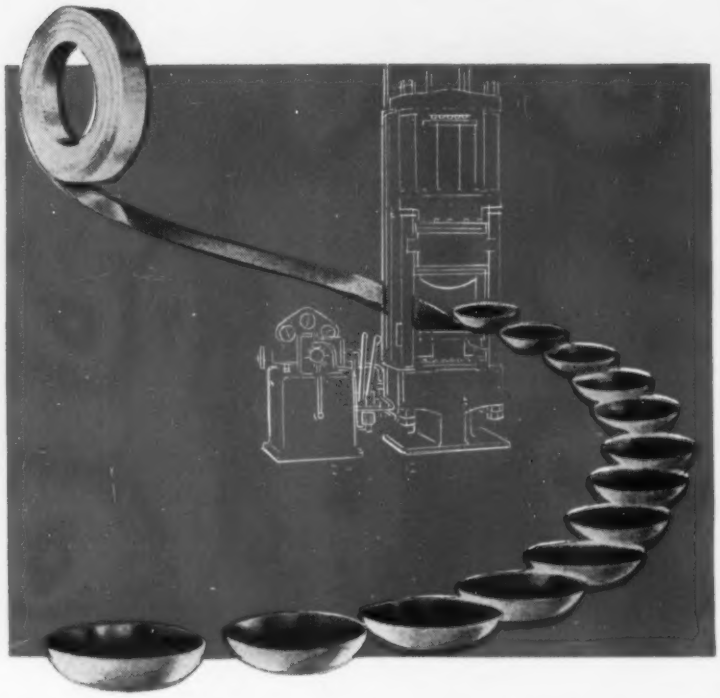
Turn to Page 332

VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

FOR A FINE FINISH ON YOUR QUALITY PRODUCTS *USE* FOLLANSBEE COLD ROLLED STRIP



For fabricating your quality products with a fine finish—use Follansbee Cold Rolled Strip.

Follansbee Cold Rolled Strip is rolled, tempered and supplied to your specifications—a custom-made, quality strip that fulfills most manufacturing needs.

Follansbee custom-quality Cold Rolled Strip can be delivered from the mill directly to you providing a continuous supply of uniform steel from coils to your automatics, regardless of forming operations involved. For flat stamping to deep drawings, Follansbee Cold Rolled Strip is the answer to your production problems.

Consult your trained Follansbee Steel representative. He will be glad to discuss your fabricating problems with you.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

POLISHED BLUE SHEETS AND COILS SEAMLESS TERNE ROLL ROOFING COLD ROLLED STRIP

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Mills*—Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa. Rochester, N.Y. Fairfield, Conn.

—Tool Steels—

Continued

Columbia Double Special
A water hardening steel containing C 130, W 3.75 and Cr 0.30. Deep hardening with very high abrasion resistance for drawing dies and fast finishing tools. Columbia Tool Steel Co.

Columbia Oildie
An oil hardening non-deforming chromium tungsten die steel. C 1.05, Mn .70, Cr 1.60, W .50. Deep hardening with high strength for heavy blanking, piercing, shaving, trimming and forming dies and die sinking hubs. Columbia Tool Steel Co.

Commando 47 S1
Simonds Saw and Steel Co.

Comokut T4
Bethlehem Steel Co., Inc.

Conqueror W1

Conqueror Hollow W1
Lehigh Steel Corp.

Coppco 120 W1 (1.20C)

Coppco 200 O1

Coppco Hot Work No. 1 H12

Coppco Shock S5

Coppco Universal W1 (1.00C)
Copperweld Steel Co.

Corinth
A general purpose carbon tool steel, containing C 0.70 to 1.10, Mn 0.30.
Allegheny Ludlum Steel Corp.

Cr-Mo-V H-13

Cr-Mo-W H12
Bethlehem Steel Co., Inc.

Crescent Special W1 (Gr. 1)
Crucible Steel Co. of America

Cro-Mo-Loy A2
Atlas Steels Ltd.

Crocar
A high carbon, high chromium, oil hardening die steel. Vanadium-Alloys Steel Co.

Crodi H11
Atlas Steels Ltd.

Croloy D2
Henry Disston & Sons, Inc.

"Things going pretty smoothly these days?"

Croma
A special analysis alloy steel of high physical properties for heavy duty machine parts. Lehigh Steel Corp.

Cromo
Shock resisting steel, for chisels, etc. Contains C 0.50, Cr 1.10, Mo 0.50. Bissett Steel Co.

Cromo Cast D2
Gorham Tool Co.

Cromoco D5
Firth Sterling Inc.

Cromodi
A pre heat treated brake die steel that offers machinability, non-deforming characteristics and high tensile strength. Pyramid Steel Co.

Cromovan D2
Firth Sterling Inc.

Crow
Carbon-chrome, water hardening steel, for drawing dies, forming rolls, etc. Has good shrinkage quality, and hardens deeper than carbon tool steel. Contains C 1.20, Mn 0.25, Cr 0.50. Allegheny Ludlum Steel Corp.

Crown
Cr-V tool steel, for springs, bolts, gears, dies, pinions, etc. Contains C 0.50, Mn 0.80, Si 0.25, Cr 1.00, V 0.20. Latrobe Steel Co.

Crown W 20
A special alloy steel, containing W. Boyd-Wagner Co.

Cuprodie
Ni-Cr-Mo-Cu die block and hot work die steel. Furnished in 5 different hardness ranges from 477-269 Bhn. Furnished heat treated only. A. Finkl & Sons Co.

Cyclops No. 67 S5
Universal-Cyclops Steel Corp.

D

D-6-Co T4

D-29 S2
Henry Disston & Sons, Inc.

D-C-33
A hot work steel. Contains C 0.33, Mn 0.27 to 0.35, Si 0.90, Cr 4.75 to 5.00, W 1.25 to 1.50, Mo 1.50. Kloster Steel Corp.

D-C-66
A hot work steel. Contains C 0.30, Mn 0.31 to 0.43, Si 0.20 to 0.36, Cr 3.50, W 8.50 to 9.00, V 0.27. Kloster Steel Corp.

Darwin 1 D2

Darwin 505 T4

Darwin 505 Special T5

Darwin 1366 T6
Darwin & Milner, Inc.

Darwin Brake Die Steel
A low-alloy type, special purpose tool steel. Contains chromium and molybdenum. Darwin & Milner, Inc.

Darwin Extra Tough S6
A shock resistant tool steel. Darwin & Milner, Inc.

Darwin M3 M3

Darwin Special W1 (1.20C)

Turn Page

CLEVELAND Top Quality FASTENERS
Cap Screws: All standard heads—Hexagon (bright and high carbon heat treated)—Flat—Fillister—Socket (plain and knurled and flat heads)—Special. Extra large sizes—extra and special lengths—special materials.
Also larger than usually listed hex head and flat head cap screws.

Set Screws:
Square Head Cup Point in an unusually wide range of sizes. Other points available.
Milled Studs:
All standard sizes through 1¼" diameter. Also special sizes and threads.

Your own design parts—cold headed or single or double extruded, accurate as to dimensional detail, heat treated as required. Send blue prints and specifications to our factory.

CLEVELAND Top Quality FASTENERS

THE CLEVELAND CAP SCREW COMPANY
2929 East 79th Street, Cleveland 4, Ohio
Warehouses: Chicago • Philadelphia • New York • Providence
originators of the Kaufman DOUBLE EXTRUSION Process
Ask your jobber for Cleveland Fasteners

For any shaft that turns... welded tubular design gives the most strength at the least weight!

• Pound for pound, a tubular section will carry more torsional load than any other shape. This, plus ease of fabrication, accounts for the universal use of electric-welded steel tubing for automotive drive shafts, torque tubes, etc.

Investigate the economy and physical advantages of Brainard welded steel tubing for *your* products. Write Brainard Steel Division, Dept. O-1, Griswold Street, Warren, Ohio. An integrated producer; offices throughout the U. S.

Brainard
SHARON STEEL
STEEL DIVISION
SHARON STEEL CORPORATION

WELDED STEEL TUBING

Tool Steels

Continued

Darwin Standard Carbon W1 (0.90C)

Darwin Temper Tough L6
Darwin & Milner, Inc.

DBL-2 M2

DBL-3 M3
Allegheny Ludlum Steel Corp.

DD1
An alloy steel for machine parts and heavy duty applications. Lehigh Steel Corp.

Delaware Extra
A water hardening, carbon tool steel for general purposes. Contains C 0.65 to 1.00, Mn 0.30, Si 0.20. Delaware Tool Steel Corp.

Delcar W1

Delsteel Alloy S5
Delaware Tool Steel Corp.

Delsteel Alloy ST
Self-tempering version of Delsteel Alloy. Delaware Tool Steel Corp.

Demmler D
An oil hardening tool steel of great toughness and strength. Contains C 0.55, Mn 0.90, Cr 1.00, V 0.20. Firth Sterling Inc.

Densite AH D2
Jamison Steel Corp.

Deward O2
Allegheny Ludlum Steel Corp.

Dexite 14
For dies and shear blades; provides toughness in a high degree of hardness. North American Steel Co.

Dialloy
A cast Mn-Mo-Cr-Ni punch steel. Air, flame or oil hardening. For high resistance to shock or fatigue. Gorham Tool Co.

Diamond "E" Polished Drill Rod W1
Edgcomb Steel Co.

Diamond S W1-W3 (Gr. 3)
Simonds Saw and Steel Co.

Dica B H12

Dica B Modified H11
Jessop Steel Co.

Die Block W1 (0.80C)
Columbia Tool Steel Co.

Dietemper-1
Special purpose hot work steels. Contain C 0.40, Mn 0.65, Si 0.30, Cr 1.50, V 0.25, Mo 1.00. Gulf Steel Corp.

Dietemper-2
Contains C 0.30, Cr 2.75, Mo 0.30, W 9.50, Ni 1.60. Gulf Steel Corp.

Diewear O1
Gorham Tool Co.

Dimol M1
Henry Disston & Sons, Inc.

DNV H21
Simonds Saw and Steel Co.

DoAll O. H.
Oil hardening non-deforming tool and die steel recommended for dies, punches, gages, and machine parts. Contains C 1.20, Mn .75, Cr .55, Mo .33. The DoAll Co.

Double Six D3

Double Seven D5
A. Milne & Co.

Dreadnought T1
Hawkridge Brothers Co.

Drillalloy
A water or oil hardening steel for rivet sets, punches and dies. Has high toughness, hardness and fatigue resistance. Contains C 0.50, Mn 0.80, Si 0.55, Cr 0.75. Delaware Tool Steel Corp.

Dukane Drill Rod W1 (1.00C)
Pittsburgh Tool Steel Wire Co.

Dumore
5% chrome air hardening steel. Ziv Steel & Wire Co.

Dumost 2 W2 (0.90C)

Dumost 3 W2 (1.00C)
Republic Steel Corp.

Duplex W-1

Duplex W1
Faitoute Iron & Steel Co., Inc.

Duramold A
A 5 pct chromium mold steel. Bethlehem Steel Co., Inc.

Duramold B
A 1 pct chromium mold steel. Bethlehem Steel Co., Inc.

Duramold C
A straight carbon mold steel. Bethlehem Steel Co., Inc.

Duramold N
A chromium-nickel mold steel. Bethlehem Steel Co., Inc.

Durax S1
Swedish-American Steel Corp.

Duredge S5
Boyd-Wagner Co.

Duro
An oil hardening die steel for production dies including blanking, drawing, forming, and laminating. Also for paper knives, reamers, taps, etc. Erie Steel Co.

Durodi
Ni-Cr-Mo-Si die block and hot work die steel furnished in both heat treated and annealed condition. A. Finkl & Sons Co.

Dycast 1 H11
Latrobe Steel Co.

Dycro
High carbon, high-chrome, air hardening tool steel for blanking dies, broaches, rolls, cold extrusion, etc. Contains C 1.50, Cr 12.00, V 0.25, Mo 0.80. Pennsylvania Steel Corp.

Dycro 1 A-1
Gulf Steel Corp.

E

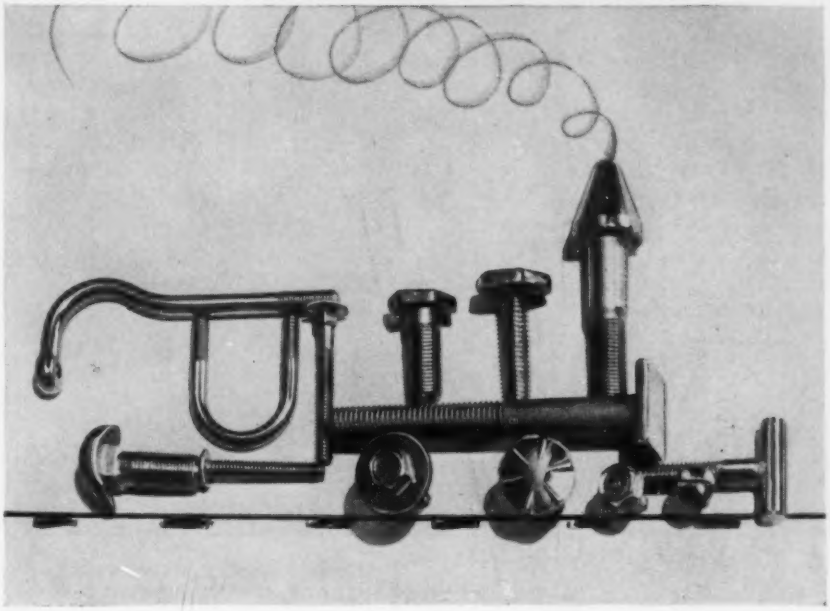
E.H.W. 1
General hot work tungsten steel. Used where extreme toughness is essential; hot heading dies, etc. Contains C 0.25, Mn 0.30, Si 0.25, Cr 4.00, V 0.50, W 15.00. Latrobe Steel Co.

E.S.A.
Water hardening, tungsten steel, for burnishing tools, counter bores, drawing dies, finishing cutters, spinning tools. Contains C 1.40, Mn 0.25, Si 0.25, Cr 0.15, V 0.15, W 4.00. Latrobe Steel Co.

E.V.M. T2
Vanadium-Alloys Steel Co.

Turn Page

Get on the right track for SPECIAL BOLTS!



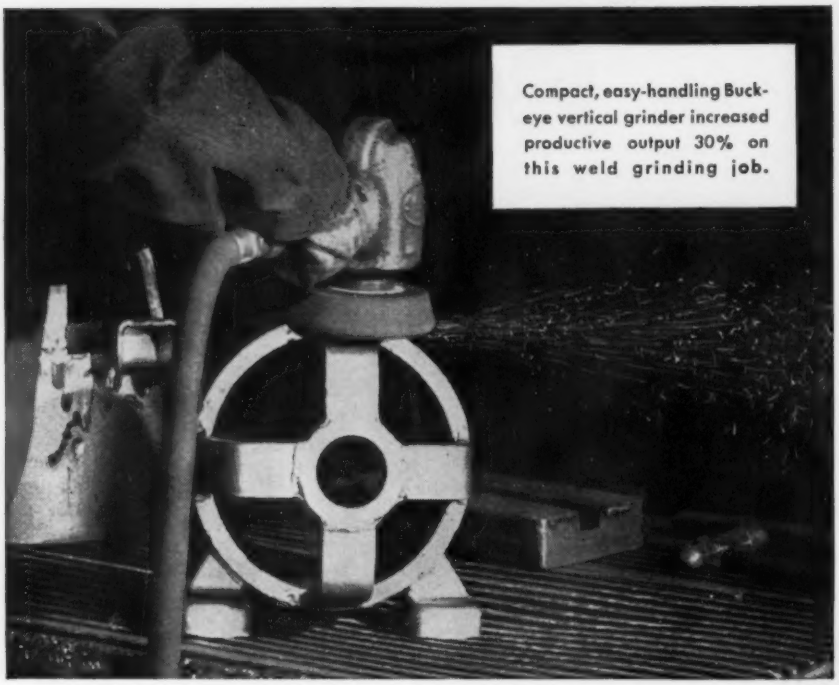
● Take a tip from leading concerns which have found the answer to their fastener problems in specially designed Circle Ⓑ bolts. They are producing better designed, stronger products, with more sales appeal, faster . . . and getting them often at considerable savings in time and money.

● We are equipped to help you realize these and other advantages. You can get on the right track by writing for complete details pertaining to your individual requirements.

BUFFALO
BOLT COMPANY
Division of Buffalo-Eclipse Corporation
North Tonawanda, N. Y.
Sales Offices in Principal Cities

PRODUCERS OF CIRCLE Ⓑ PRODUCTS — BOLTS • NUTS • RIVETS AND SPECIAL FASTENERS

▶ increases output 30% on grinding operations



Compact, easy-handling Buckeye vertical grinder increased productive output 30% on this weld grinding job.

In a routine check of production operations, a welding equipment manufacturer discovered a grinder operating well below the RPM recommended for the work being done.

Replacing this tool with a Buckeye 6,000 RPM vertical grinder resulted in an immediate increase of 30% in productive output on this grinding job. In addition, the lighter, more powerful Buckeye grinder helped improve product quality, reduce tool maintenance costs, employee fatigue.

All of which proves it's very important to select the right tool for the job—and very expensive to go on using older, less efficient tools.

▶ what are you waiting for?

The right tool for your job may well be described in the Buckeye air or electric tools catalogs. We'd like to send you either—or both—without obligation, of course.

Buckeye Tools CORPORATION

DIVISION 11 • DAYTON 1, OHIO

Portable Air and Electric Tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

—Tool Steels—

Continued

EB Alloy
General purpose, chrome, hot-work, air or oil hardening steel, for hot header and gripper dies on bolts and rivets, shear blades, trimmer dies, etc. Good resistance to abrasion and heat and less expensive than tungsten, hot work steels. Contains C 0.65, Cr 3.75, V 0.40, Mo 0.50. Allegheny Ludlum Steel Corp.

EIS H5
An oil hardening steel for plastic molding dies. Contains C 0.55, Mn 0.80, Cr 1.00, Mo 0.45, V 0.08, Si 0.25. Heppenstall Co.

EIS H41
An oil or air hardening, cold or hot trimmer steel. Contains C 0.95, Mn 0.30, Cr 4.00, Mo 0.25, V 0.20. Heppenstall Co.

EIS H720
An air hardening steel for die casting dies and inserts. Contains C 0.40, Mn 0.40, Cr 5.25, Mo 1.15, V 1.00. Heppenstall Co.

EIS R43
An air hardening steel for shear knives, trimmers and dies. Contains C 1.55, Mn 0.25, Cr 11.50 and other alloys. Heppenstall Co.

EIS R45
An air hardening steel for heavy shear knives. Contains C 0.85, Mn 0.25, Cr 11.50, Mo 0.50. Heppenstall Co.

EIS R97
An oil hardening steel for shear knives. Contains C 0.58, Mn 1.00, Si 2.15, Mo 0.40 and Cr. Heppenstall Co.

EIS R718
An air hardening steel for dies, inserts, punches, shear knives, etc. Contains C 0.35, Mn 0.30, Si 1.00, Cr 5.00, Mo 2.00. Heppenstall Co.

EIS T51
An oil hardening, cold or hot trimmer steel. Contains C 0.65, Mn 0.70, Cr 0.70, Ni 1.50, W 2.25. Heppentall Co.

EIS T73
An oil hardening hot work steel for dies, inserts and punches. Contains C 0.28, Mn 0.30, Cr 3.50, W 9.00, V 0.25. Heppenstall Co.

EIS T77
An oil, air hardening steel for hot shearing. Contains C 0.33, Mn 0.30, Co 4.00, W 12.00, V 0.25, Si 0.30. Heppenstall Co.

EIS T721
An oil, air hardening steel for die casting dies. Contains Cr 5.00, Mo 1.50, W 1.25, V 20. Heppenstall Co.

"What do you want now?"

EIS V2
A water hardening steel for cold heavy duty shearing, containing C 0.80, Mn 0.40, Si and V. Heppenstall Co.

EIS V3
A water hardening steel for light shear knives and trimmers. Contains C 0.95, Mn 0.40, Si and V. Heppenstall Co.

EK 81 D5
Universal-Cyclops Steel Corp.

Elastuf "44"
A special analysis Cr-Ni-Mo electric furnace steel, heat treated, with guaranteed mechanical properties. Horace T. Potts Co.

Elastuf Chro-Moly
A modified heat treated steel. Horace T. Potts Co., Philadelphia.

Elastuf Type A-2
A special analysis Cr-V steel with small controlled amounts of Ni and Mo. A heat treated steel with guaranteed mechanical properties. Horace T. Potts Co.

Eletrex W1 (1.00 C)
Columbia Tool Steel Co.

Electrite 1 T1
Latrobe Steel Co.

Electrite 5
Tungsten high speed steel in which carbon content has been reduced to increase toughness. For trimming dies, heading dies, etc. Also has good wear resistance. Contains C 0.57, W 17.75, Cr 4.00, V 1.00. Latrobe Steel Co.

Electrite 7
Low C-W-Mo high speed steel in which the carbon content has been lowered to provide increased toughness where maximum hardness is not required. Also has good wear resistance and cutting ability. Contains C 0.67, W 6.25, Cr 4.00, V 1.90, Mo 5.00. Latrobe Steel Co.

Electrite 19 T2

Electrite CO-6 M36

Electrite Cobalt T4
Latrobe Steel Co.

Electrite Cromolon
Mo-Cr-Co high speed steels for taps, blanking punches, thread chasers, etc. Has high red hardness characteristics and wear resistance. Contains C 0.90, W 1.50, Cr 8.25, V 1.50, Mo 8.75, Co 3.75. Latrobe Steel Co.

Electrite Double Six M2

Electrite HV-6 M2
Latrobe Steel Co.

Electrite MV-1
Mo-V low alloy high speed steel for use where toughness is more important than abrasion resistance. Has good cutting ability for tools taking light cuts. Contains C 0.80, Cr 4.10, V 1.10, Mo 4.25. Latrobe Steel Co.

Electrite MV-2
Mo-V low alloy high speed steel for cutting tools not requiring full alloy values. Has high toughness and cutting ability. Contains C 0.88, Cr 4.10, V 1.85, Mo 4.25. Latrobe Steel Co.

Electrite MV-3
Mo-V high speed steel for inter-

Turn Page

PROBING INTO
30 FEET OF SOLID STEEL
FOR DEFECTS
SPERRY . . .

OFFERS THESE
COST SAVING ADVANTAGES

- Easily portable for on-the-job inspection.
- Improves quality control, increases customer acceptance of your product.
- Locates defects *before* machining saving wasted production time.
- Maintenance inspection without disassembly eliminates shutdowns.

INDUSTRIES NOW USING
THE SPERRY
ULTRASONIC REFLECTOSCOPE
INCLUDE:

AIRCRAFT
AUTOMOTIVE
CHEMICAL
LIGHT METALS
MARINE
ORDNANCE
PAPER
PIPE
RAILROAD
STEEL

Sperry is a name long synonymous with scientific research and development. Pioneer in non-destructive testing, Sperry now makes possible the ULTRASONIC detection of hidden defects in raw stock and in semi-finished or finished material.

The REFLECTOSCOPE generates ultra high frequency sound waves that penetrate up to 30 feet in solid metal; any internal defects are located instantly and accurately.

The Sperry Reflectoscope — most versatile testing instrument ever developed — is available to industry for sale, for lease or as a day-to-day testing service. LEARN HOW Reflectoscope testing has solved costly inspection problems. WRITE TODAY for illustrated Industrial Application Reports, stating the item to be tested and your inspection problem.

Sperry

SPERRY ALSO MANUFACTURES
COUPLINGS, HYDRAULIC CONTROLS
AND OTHER TESTING EQUIPMENT

SPERRY PRODUCTS, INC.
301 Shelter Rock Road
Danbury, Connecticut

Please send me Industrial Application Report on:
ITEM TO BE TESTED _____
INSPECTION PROBLEM _____
NAME _____
TITLE _____
COMPANY _____
CO. ADDRESS _____
CITY _____ ZONE _____ STATE _____

ALTEN

A Dependable Supplier of Metal Parts and Assemblies for Machinery

HERE'S HOW WE CAN SERVE YOU

Get practical help from our Engineering Department — gain speed and save by sub-contracting medium and large sized intricate jobs involving weldments, machined castings, complete or sub-assemblies. Alten has the size, the equipment, the "know-how."

Facilities include gray iron and alloy foundries, machine shops with boring mills, automatic and turret lathes, drill presses, screw machines, broaches, milling machines, surface grinders, external grinders, etc. Structural departments for shearing, rolling, punching, forming, gas-cutting, welding and assembly. In all, two modern equipped plants, twenty-five (25) acres.

FOR ENGINEERING AND CONSTRUCTION COMPANIES — Alten now produces refinery and industrial furnaces, alloy industrial furnace castings, burners, heat exchangers, welded steel fabrications delivered to job sites.

FOR MACHINERY MANUFACTURERS — Alten builds machine bases, oil pans, pump and compressor parts, hydraulic components and many other machinery parts.

FOR BUILDERS OF EARTH MOVING EQUIPMENT — Alten makes clutch housings, clutch drums, drum spools, brake drums, wheels, transmission cases, etc.

A complete list of production possibilities is almost inexhaustable. Send your inquiries and prints.

"Served by two railroads and many trucklines".

Centrally Located In The Heart of Industrial America

—ALTEN—
Foundry & Machine Works, Inc.
LANCASTER, OHIO
Since 1889

Write Today for Booklet Describing Facilities

—Tool Steels—

Continued

mediate applications requiring abrasion resistance. Has high toughness and red hardness. Contains C 1.18, Cr 4.10, V 3.15, Mo 4.25. Latrobe Steel Co.

Electrite MV-4
Mo-V high speed steel for machining highly abrasive materials. Has high toughness and exceptional red hardness. Contains C 1.40, Cr 4.10, V 4.15, Mo 4.25. Latrobe Steel Co.

Electrite Super Cobalt T5

Electrite Tatmo M1
Latrobe Steel Co.

Electrite TNW
Molybdenum high speed steel for cutting tools, drills, reamers, etc. Contains C 0.88, Mn 0.25, Si 0.25, V 1.90, Cr 4.00, Mo 8.00. Latrobe Steel Co.

Electrite U
Tungsten high speed steel, for tools, reamers, drills. Has high red hardness. Contains C 0.75, Mn 0.25, Si 0.25, Cr 4.25, V 1.90, W 14.00. Latrobe Steel Co.

Electrite U.B. T8

Electrite Ultra Cobalt T6

Electrite Vanadium T3
Latrobe Steel Co.

Elvandi W2
Vanadium Alloys Steel Co.

Emro
A medium carbon, electric furnace steel for forging applications. Offers resistance to strain, vibration, shock and extreme stress. Pyramid Steel Co.

Erco
A high grade, water hardening carbon tool steel for shock resistance. An all-purpose steel designed to resist alternate heating and chilling. Erie Steel Co.

Erie 5
A water hardening alloy tool steel for general purpose work in machine and maintenance shops, including shear blades, punches, blacksmith tools, etc. Erie Steel Co.

Erie AA
A general purpose tungsten high speed steel with high resistance to wear for all types of cutting tools and hot and cold work dies. Erie Steel Co.

ERIE RA
A cobalt high speed steel for cutting, highly resistant to severe abuse and abrasion. Air hardening, resistant to very high frictional heat. Erie Steel Co.

EUB-4
A super high speed steel. Has high hardness, extreme wear resistance and good edge strength. Contains C 1.50, W 13.50, Cr 4.50, V 4.75, Co 5.00, Mo 0.50. Latrobe Steel Co.

EUB 4M
A super high speed steel containing cobalt for extra duty cutting. Has high hardness, extreme wear resistance, good toughness and edge strength. Contains C 1.50, W 6.50, Mo 5.00, Cr 4.25, V 4.75, Co 5.00. Latrobe Steel Co.

Exl-Die O1
Columbia Tool Steel Co.

Turn to Page 342

WAREHOUSE STOCK

Why they think of WARD when it's SPRING STEEL

•

Why do so many concerns refer to WARD as "THE HOUSE OF SPRING STEEL?"

Over the years, satisfied users throughout the United States and Canada knew they could obtain the proper grade of SPRING STEEL for the intended application.

Adequate stocks are always available, with two thousand (2,000) sizes of both TEMPERED and UNTEMPERED grades, which give the customer an UNLIMITED SELECTION.

If WARD is not your TOP SOURCE for SPRING STEEL, then we respectfully solicit your consideration with the confidence, once you patronize WARD, you will be among the countless steady users of this highly specialized product.

Our general catalog will be furnished upon request.

•

WARD STEEL CO.

87B Rindge Avenue Extension • Cambridge 40, Mass.

UNiversity 4-2460

Branches

7 Fenner St., Providence, R. I., GAspee 1-5573, 1-8573

3042-3058 West 51st Street, Chicago, Illinois, GRovehill 6-2600

Sales Agent: THE MILLER STEEL COMPANY, INC.

40-50A Montgomery Street, Hillside 5, New Jersey

Hillside Phone: WAverly 3-8000—New York Phone: BArclay 7-2056

Continued

Extra
Water hardening carbon tool steel. High hardness with a tough center. Kloster Steel Corp.

Extra W1
Henry Disston & Sons, Inc.

Extra W1
Latrobe Steel Co.

Extra W1
Universal-Cyclops Steel Corp.

Extra W1 (0.80 to 1.20 C)
Republic Steel Corp.

Extra W1 (1.00 C)
Columbia Tool Steel Co.

Extra W1 (Gr. 2, 0.80 to 1.20 C)
Firth Sterling, Inc.

Extra Carbon
Water hardening best grade, carbon tool steel, for engraving tools, shear blades, taps, reamers. Contains C as specified, Mn 0.25, Si 0.25. Latrobe Steel Co.

Extra Draco W2

Extra Draco DV W3
Universal-Cyclops Steel Corp.

Extra H W3
Raven Steel & Tool Co.

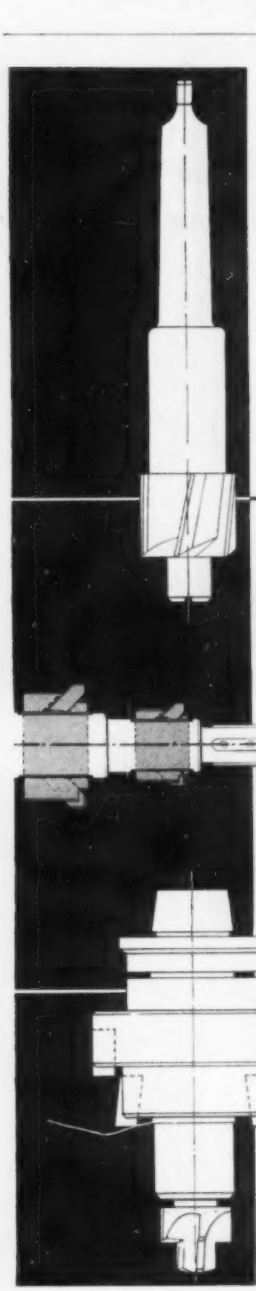
Extra Header Die W1 (0.90 C)
Columbia Tool Steel Co.

Extra L W1
Vanadium-Alloys Steel Co.

Extra S W2
Raven Steel & Tool Co.

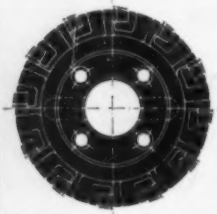
Extra Special HS
A 14-4-2 tungsten high speed steel. Bethlehem Steel Co., Inc.

Extra Tough & Hard W1 (1.10 C)
Raven Steel & Tool Co.



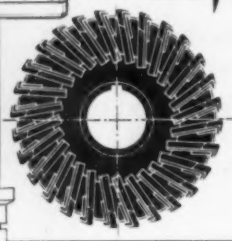
Ask for the New Standard Tool Catalog and Price List!

STANDARD CUTTING TOOLS
Interchangeable Counterbores and Countersinks in *Economy*, *Quick-Change* and *Heavy-Duty* types . . . with standard, threaded, and full-floating holders. Interchangeable Back Spotfacers and Core Drills . . . Tungsten-Carbide Tipped Counterbores.



E-Con-O-Mill Standard Milling Cutters
The same blades and locks fit cutters from 5 to 16" dia., provide savings in tool inventory, grinding costs and machine down-time.

Standard Block-Type Boring Tools
For production rough boring, semi-finishing, reaming. Quick-change blocks center automatically, without centralizing screw holes.



Gair-Lock Fine Tooth Cutters
Tapered, serrated wedges provide firm hold on inserted blades, require minimum space. Gair-Lock Catalog shows special applications.

SPECIAL TOOLS
From small multi-diameter cutters to large-scale tooling programs, Gairing engineers have cut production costs in many leading industries. Gairing representatives are well qualified to discuss any cutting tool problem with you.

THE GAIRING TOOL COMPANY
P. O. Box 478, Roosevelt Park Annex
DETROIT 32, MICHIGAN

Extra V W2 (Gr. 2, 0.90 to 1.00 C)
Firth Sterling, Inc.

Extra Valtool W2
Henry Disston & Sons, Inc.

Extra Vanadium W2 (0.90 C)
Columbia Tool Steel Co.

EZ 9W
A lower tungsten bearing hot work steel possessing red hardness and resistance to abrasion. Used largely for gripper and hot forming dies, etc. Boyd-Wagner Co.

EZ 14W
A tungsten bearing alloy steel with high red hardness and resistance to abrasion. Boyd-Wagner Co.

Ez-Die A2
Columbia Tool Steel Co.

F

F. C. C. 1
An oil hardening forged steel, used for die blocks. Contains C 0.45 to 0.55, Mn 0.50 to 0.60, Si 0.10 to 0.20, Cr 0.60 to 0.75, Ni 1.50 to 1.75. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 2
An oil hardening forged steel, used for upset inserts. Contains C 0.18 to 0.23, Mn 0.40 to 0.60, Si 0.15 to 0.25, Cr 1.40 to 1.60, Mo 0.45 to 0.55, Co 1.00 to 1.25. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 5XI
An oil hardening forged steel for general hot work applications. Contains C 0.30 to 0.35, Mn 0.30 to 0.40, Si 0.85 to 1.25, Cr 4.75 to 5.25, W 1.25 to 1.50, V 0.20 to 0.30, Mo 1.20 to 1.50. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 6
A Cr-C forged steel, used for zinc die casting. Contains C 0.30 to 0.40, Mn 0.65 to 0.80, Si 0.20 to 0.30, Cr 0.90 to 1.10, V 0.15 to 0.25. Forging & Casting Div., Allegheny Ludlum Steel Corp.

"The Army doesn't want this generally known . . ."

F. C. C. 14
An oil or air hardening forged steel, used for hot work dies. Contains C 0.30 to 0.40, Mn 0.20 to 0.35, Si 0.15 to 0.25, Cr 3.50 to 4.25, W 9.00 to 10.50, V 0.20 to 0.30. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 19
An oil hardening forged steel, used for hot work dies for aluminum extrusion dummy blocks, etc. Contains C 0.30 to 0.40, Mn 0.25 to 0.40, Si 1.25 to 1.75, Cr 4.00 to 5.50, W 3.75 to 4.25, V 0.20 to 0.35. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 20
A water hardening forged steel, used for cold draw dies. Contains C 1.30 to 1.40, Mn 0.25 to 0.35, Si 0.50 to 0.65, W 3.25 to 3.60, V 0.15 to 0.25. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 21
An oil hardening forged steel, used for aluminum blanking. Contains C 0.45 to 0.50, Mn 0.20 to 0.30, Si 0.80 to 1.00, Cr 1.30 to 1.50, W 1.50 to 2.25, V 0.15 to 0.30. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 22
An oil hardening tungsten chromium cold-work forged steel used for pneumatic tools, punches, shear blades. Contains C 0.45 to 0.52, Mn 0.20 to 0.35, Si 0.20 to 0.35, Cr 1.00 to 1.50, W 2.50 to 3.25, V 0.15 to 0.30. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 23
An oil hardening forged steel, used for extrusion liners. Contains C 0.35 to 0.42, Mn 0.40 to 0.80, Si 0.60 to 1.10, Cr 1.00 to 1.50, W 3.75 to 4.25, V 0.15 to 0.30. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 55 Cast-to-Shape
An air hardening high-carbon, high-chromium cast steel, used for cut edges and forming. Contains C 1.45 to 1.60, Mn 0.30 to 0.50, Si 0.35 to 0.45, Cr 11.50 to 12.50, Mo 0.85 to 1.00, V 0.40 to 0.60, Co 1.75 to 2.25. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 66
An air hardening forged steel, used for cut edges and forming. Contains C 1.45 to 1.60, Mn 0.30 to 0.50, Si 0.25 to 0.45, Cr 11.50 to 13.00, Mo 0.85 to 1.00, V 0.40 to 0.60, Co 3.00 to 3.50, Ni 0.30 to 0.45. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. 66 Cast-to-Shape
An air hardening high-carbon, high-chromium cast steel, used for heavy duty cutting and forming and some hot forming. Contains C 1.45 to 1.60, Mn 0.30 to 0.50, Si 0.35 to 0.45, Cr 11.50 to 12.50, Mo 0.85 to 1.00, V 0.40 to 0.60, Co 3.00 to 3.50. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. Air Hardening
An air hardening high-carbon high-chromium forged steel, used for edge cutting and forming. Contains C 1.45 to 1.60, Mn 0.30 to 0.50, Si 0.35 to 0.45, Cr 11.50 to 12.50, Mo 0.70 to 0.90, V 0.40 to 0.60, Co 0.70 to 0.80. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. Air Hardening Cast-to-Shape
An air hardening high-carbon high chromium cast steel, used for edge cutting and forming. Contains C 1.45 to 1.60, Mn 0.30 to 0.50, Si 0.35 to 0.45, Cr 11.50 to 12.50, Mo 0.70 to 0.90, V 0.40 to 0.60, Co 0.70 to 0.80. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. C. M. S. Cast-to-Shape
An oil and air hardening cast steel, used for forming. Contains C 0.55 to 0.65, Mn 0.60 to 0.80, Si 0.30 to 0.40, Cr 0.80 to 1.20, V 0.10, Mo 0.35 to 0.45, Ni 0.40 to 0.50. Forging & Casting Div., Allegheny Ludlum Steel Corp.

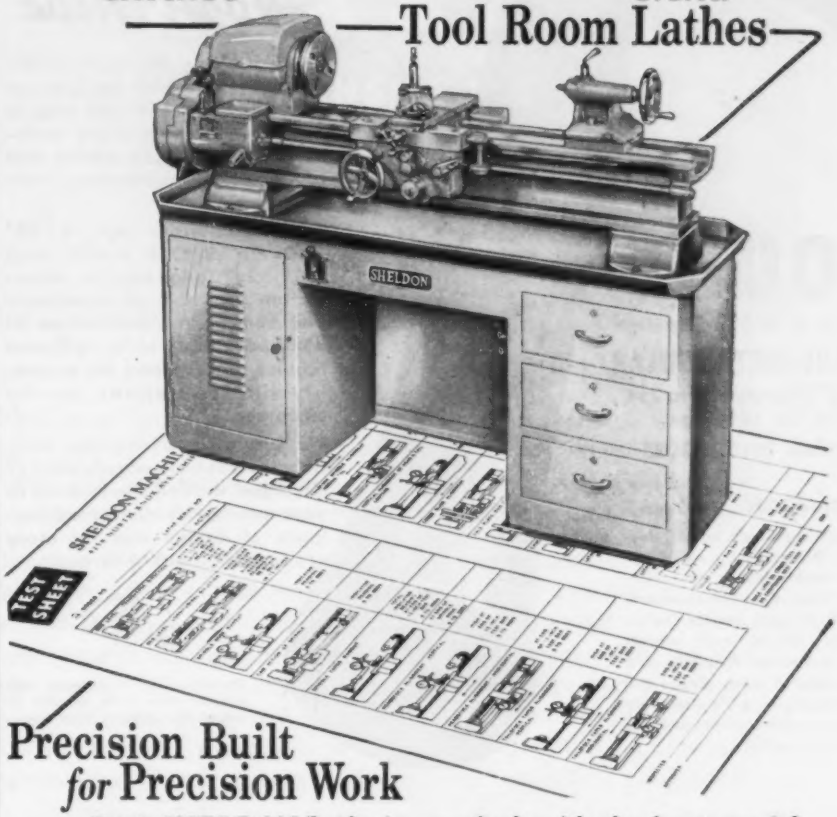
F. C. C. Fernite 24 Cast-to-Shape
A cast hot-work steel used for special forming and sizing dies. Contains C 2.20 to 2.40, Mn 0.20 to 0.40, Si 0.20 to 0.30, Cr 23.00 to 25.00, W 5.00 to 5.50, V 0.20 to 0.30, Ni 0.20 to 0.30. Forging & Casting Div., Allegheny Ludlum Steel Corp.

F. C. C. Flamhard Cast-to-Shape
A flame-hardenable cast steel used for forming. Contains C 0.45 to 0.55, Mn 1.00 to 1.25, Si 0.40 to 0.60, Cr 1.00 to 1.40, V 0.10, Mo 0.35 to 0.45. Forging & Casting Div., Allegheny Ludlum Steel Corp.

Turn Page

SHELDON
CHICAGO U. S. A.

Tool Room Lathes



Precision Built *for* Precision Work

Each SHELDON Lathe is a precision machine tool that in final inspection has passed the 19 accuracy checks on the SHELDON "Inspection Test Sheet."

Produced by modern methods with the finest special machines, these 10″, 11″ and 12″ (swings 13″) lathes are quality built on a quantity production basis. Selling at quantity production prices they are today's best lathe values.

Write for Catalog with Check Chart

SHELDON MACHINE CO., INC. 4224 North Knox Ave., Chicago 41, Illinois

the A-B-C of M-S-T

A ALWAYS MAKES POSSIBLE
B ETTER PRODUCTS
C AT LOWER OST

Michigan Electric Resistance WELDED STEEL TUBING

A Quality Product

ROUND

3/8" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

1/2" to 2" 20 gauge, 1" to 2¾", 14, 16, 18 gauge

Carbon 1010 to 1025

Michigan Tubing

has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Horn Tube

Fabrication by Michigan of this volume part, which has a diameter variation of 51 per cent, is only one example of the workability of Michigan tubing and of Michigan engineering competence.

Tube dimensions are: 1.740" O. D. x .712" O. D. x .035" wall x 11.625" long. Into its manufacture go years of experience and skill in the fabrication of hundreds of widely different tubular parts, ready for assembly line operations by the customer.

We suggest you examine carefully the possible adaptability of Michigan welded steel tubing to your product, both for advantages of design and for more economical manufacture.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

Michigan ELECTRIC RESISTANCE WELDED STEEL TUBING PRODUCTS CO.

THE OLDEST NAME IN

More than 35 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN—SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland Co., Dayton, Ohio—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—Hugh Davis, Jr., Sewickley, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—Harry E. Clark & Co., Houston, Texas—J. B. Beaird Co., Inc., Shreveport, La.—C. I. Crais Co., Birmingham, Alabama.

—Tool Steels—

Continued

F. C. C. Oil Hardening Cast-to-Shape
An oil hardening cast manganese steel, used for forming. Contains C 0.85 to 0.95, Mn 1.00 to 1.25, Si 0.20 to 0.30, Cr 0.40 to 0.60, W 0.40 to 0.60, V 0.20 to 0.30. Forging & Casting Div. Allegheny Ludlum Steel Corp.

F. C. C. Roloy Cast-to-Shape
An air hardening cast steel used for rolls on electric welded tube mills. Contains C 1.45 to 1.60, Mn 0.30 to 0.50, Si 0.35 to 0.45, Cr 11.50 to 12.50, V 0.40 to 0.60, Mo 1.00 to 1.25, C 0.70 to 0.80. Forging & Casting Div. Allegheny Ludlum Steel Corp.

F. N. S.
Atlas Steels Ltd.

F. S. 2-5
Firth Sterling, Inc.

F. S. M-10
An 8-0-2 molybdenum base high speed tool steel. Firth Sterling, Inc.

F. S. M-10 Mod.
Hot work steel for high-temperature hot work applications requiring excellent red-hardness and abrasion resistance. Contains C 0.65, Cr 4.00, Mo 8.25, V 2.00. Firth Sterling Inc.

Falcon
Atlas Steels Ltd.

Fastbor
A straight-carbon hollow mining drill steel. Contains C 0.80, Mn 0.25, Si 0.10. Great Western Steel Co., Inc.

Fastbor Hollow Drill
A straight-carbon hollow mining drill steel. Contains C 0.80, Mn 0.25, Si 0.10. Hoyland Steel Co., Inc.

FC W1 (1.00 C)

FCCR
Bowsteel Distributors Corp.

Ferno
A tool steel particularly adapted for hot die and punch work. Lehigh Steel Corp.

Firedie H1
Columbia Tool Steel Co.

Firex-Special
Air or oil-hardening steel, for tools resisting shock; also hot work applications such as shears, form dies, etc. Has extreme toughness. Contains C 0.40 to 0.55, Mn 0.40 to 0.90, Si 0.25 to 0.30, Cr 0.40 to 1.00, Ni 3.75 to 4.00, V 0.15 to 0.20, Mo 0.45 to 0.75. Darwin & Milner, Inc.

Firthite
Brand name of a line of carbides. Firth Sterling, Inc. (See "Carbides" section of Jan. 8, 1953, issue.

FND
Bowsteel Distributors Corp.

Forge-Die
Tungsten hotwork die steel; for applications requiring exceptional heat resistance. Contains C 0.26, W 14.00, Vanadium-Alloys Steel Co.

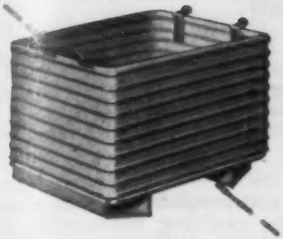
Formaloy
Boyd-Wagner Co.

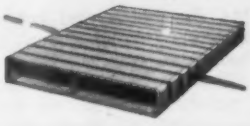
Formite 1 H2

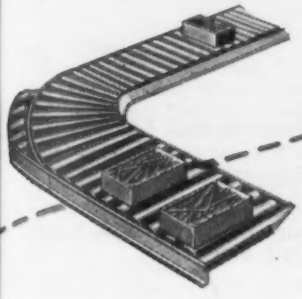
Formite 2 H2
Columbia Tool Steel Co.

Turn to Page 346

Handle materials better, more cheaply, with equipment made of







N-A-X
HIGH-TENSILE STEEL

Minimum product weight and long product service are just two important reasons why N-A-X HIGH-TENSILE steel is ideally suited for tote boxes, pallets, conveyors, lift trucks, and other equipment used for transporting materials.

Because N-A-X HIGH-TENSILE steel has exceptional strength and durability, thinner sections can be used, yet it resists abrasion, impact, fatigue, and corrosion. N-A-X HIGH-TENSILE steel gives your equipment longer life and reduces deadweight to the minimum; you can carry a greater net load of material with no increase in the gross load weight. And N-A-X HIGH-TENSILE steel has exceptional welding and fabricating qualities – important advantages where custom-made materials-handling equipment is required.

If you are interested in better, more economical materials-handling, why not investigate N-A-X HIGH-TENSILE steel *now?*

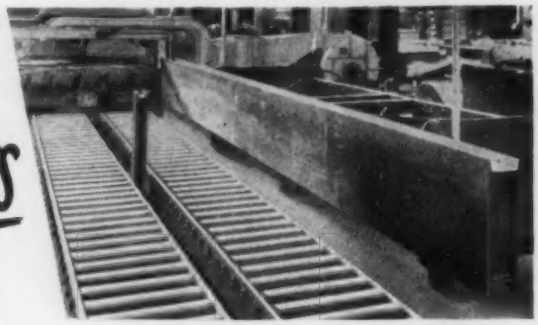
MAKE A TON OF SHEET STEEL GO FARTHER
Specify— NAX HIGH-TENSILE STEEL
... And "MAKE YOUR PRODUCT LAST LONGER"

It's your SCRAP that makes your STEEL

GREAT LAKES STEEL CORPORATION
N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

THIS TABLE'S SET FOR HEAVY GUESTS



BUT IT'S A-F *Engineered* TO TAKE IT!

STEEL SHEETS are discharged onto this A-F *Engineered* piler table at a fast clip. Each sheet strikes the end stop and the back-up bar and then drops onto the sturdy rolls of the A-F Roller Conveyor. The sheets accumulate into a well aligned stack, which frequently weighs 50 tons—a real test for any conveying equipment. This is just one section of the A-F *Engineered* Completely Co-ordinated Conveying System that has increased efficiency and lowered handling costs.

Since 1901, Alvey-Ferguson Engineers have helped thousands of plants to make worth-while economies in handling materials and products. These 52 years of know-how are available to your plant, too. Why be satisfied with less? May we discuss *modern* conveyorized methods with you? Write, without obligation—today.

THE ALVEY-FERGUSON COMPANY

556 Disney Street Cincinnati 9, Ohio

Offices or Representatives in Principal Cities

CONVEYING EQUIPMENT

A-F CONVEYING MACHINERY

Alvey-Ferguson

WASHING MACHINES FOR INDUSTRY

"READING" CRANE'S accurate spotting speeds handling of heavy loads...

To reduce handling costs and improve production, a fast, efficient 5-ton "Reading" electric crane replaced the slow-moving hoist formerly installed in the plant pictured here. This "Reading" double I-beam, floor-operated crane has a traveling speed of 150 feet per minute—and a 22' lift.

Used to lower heavy domes on their heat treating furnaces, the new crane turns a tedious, costly handling job into a swift "push-button" operation. Worker fatigue is lessened. Shutdown time is reduced. Load handling costs are cut to the bone.

Find out how "Reading" Electric Cranes are "job tailored" to fit your requirements at no extra cost. Write for our latest 16-page bulletin, "The *Why* and *How* of Faster Production".

Chain Hoists
Electric Hoists
Overhead
Traveling
Cranes

READING CRANE & HOIST CORP. • 2101 ADAMS STREET, READING, PA.

READING CRANES

—Tool Steels—

Continued

Formold
An electric furnace cold hubbing mold steel developed particularly for the plastics industry; has good core strength and excellent cold-hubbing properties. Contains C 0.07, Ni 0.55, Cr 1.35, Mo 0.20. Hawkridge Brother Co.

FPC
A non-tempering chisel steel, for chisels, caulking tools, cold cutters, stone tools, drift pins, etc. Contains C 0.30 to 0.40, Mn 0.60 to 0.80, Cr 0.70 to 0.90, Mo 0.30 to 0.60. A. Milne & Co.

FS
Ni-Cr-Mo die block and hot work die steel furnished annealed only. A. Finkl & Sons Co.

FX
Ni-Cr-Mo die black and hot work forging die steel furnished heat treated in 4 hardness ranges: 429 to 269 Bhn. A. Finkl & Sons Co.

Fuego
Used especially for pneumatic and hand chisels, cold punches, shear blades and similar tools. Alloy of Mn, Cr and V with high silicon and low carbon with phosphorus and sulphur at a minimum. Hidalgo Steel Co., Inc.

G

G30 L6
Wm. Jessop & Sons Ltd.

GH 9 H2
Gulf Steel Corp.

GH 14
Contains C 0.42, Cr 3.50, V 0.30, W 14.00. Gulf Steel Corp.

GH Van H6

GHW H1
Gulf Steel Corp.

Gibraltar W1 (1.00 C)
H. Boker & Co., Inc.

Gilmore Tool
Hot work steel. Contains C 0.95, Cr 3.50. W 1.00. Bissett Steel Co.

Gold Star T8
The Carpenter Steel Co.

"All right, Funston, so you haven't had a raise in 5 years and living costs are up. Must we follow every fool trend?"

Gormet
A cast Co-Cr-W alloy recommended for cutting highly abrasive materials or where heavy cuts are desired. Gorham Tool Co.

Grade "A" W2
The Diehl Steel Co.

Granada W1 (Gr. 4)

Granada Vanadium W2 (Gr. 3 & 4)
Crucible Steel Co. of America

Graph-Al
Water hardening steel, for tube drawing mandrels, cold heading dies, and impact applications. Good resistant to abrasion. Excellent machining and impact properties. Contains C 1.50, Mn 0.40 max., Si 0.15 to 0.25, Al 0.10 to 0.15. Timken Roller Bearing Co., Steel & Tube Div.

Graph M. N. S.
An air hardening steel for intricate dies, light section parts for cold metal forming tools, and high pressure mandrels. Non-deforming and good resistance to abrasion. Contains C 1.50, Mn 1.25, Si 1.25, Cr 0.35, Ni 1.75, Mo 0.50. Timken Roller Bearing Co., Steel & Tube Div.

Graph-Mo O6
Timken Roller Bearing Co., Steel & Tube Div.

Graph-Tung
Water hardening steel, for bar and tube cold drawing dies, deep drawing dies, bushings, general purpose dies and tools, air hammer pistons. Excellent resistance to abrasion and good impact properties. Contains C 1.50, Mn 0.40 max., Si 0.65 to 0.75, W 2.60 to 3.00, Mo 0.50. Timken Roller Bearing Co., Steel & Tube Div.

Gray Cut Cobalt T6
Vanadium Alloys Steel Co.

Green Label
A shock resisting, oil hardening steel for gears, pressure parts, crank shafts. Contains C 0.50, Mn 0.80, Cr 1.00, V 0.23. Peninsular Steel Co.

Green Label O1
Ackerlind Steel Co., Inc.

Green Label W1 (Gr. 3)
Wm. Jessop & Sons Ltd.

Green Label W1-W3 (Gr 4)
Simonds Saw and Steel Co.

Green Label Drill Rod W1 (1.20 C)
The Carpenter Steel Co.

Gripmore
Hot work steel. Contains C 0.95, Cr 3.50, W 1.00. Bissett Steel Co.

G8N D3

Gulf Air A-2

Gulf H.S. T-1

Gulf H.S.-5 T-5

Gulf M-2 M-2

Gulf O.H. O-1
Gulf Steel Corp.

GW 6-6-2 High Speed M2

GW 99 Hot Work H12

GW 265-H High Production D3

GW 265 High Production D2

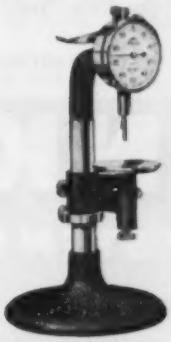
GW 280 Tufkut S5

Turn Page

FOR *Strictly* IMPERSONAL INSPECTION CHOOSE AMES DIAL COMPARATORS

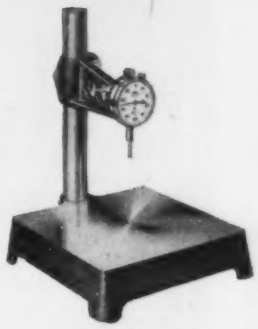
Ames Dial Comparators make the inspection of duplicate parts an extremely simple, rapid and accurate operation. Ames Comparators are strictly impersonal in their accuracy — the results being in no way dependent on the skill or judgment of the operator. The pressure of the gauging members against the work is mechanically determined and therefore uniform.

Check the Ames Dial Comparators shown — one of them may solve a Quality Control problem for you.



Ames No. 1 Dial Comparator is an easily adjustable bench model that measures objects up to 2" in cross section. The table bracket may be quickly located and locked in position on the column. The table itself may be further positioned and locked for final fine adjustment. This comparator is designated *Ames No. 1W* when equipped with dead-weight contact pressure and contact area to ASTM specifications for measuring resilient materials, such as rubber, plastics, etc.

Ames No. 2 Dial Comparator is a compact, stable bench model for measuring non-yielding materials — sheet metal, glass, hard rubber. The 2" diameter table is adjustable to bring pointer to zero. *Ames No. 2W* is similar to the Ames No. 2, but is furnished with dead-weight contact pressure and contact areas to ASTM specifications for checking textiles, plastics, sheet rubber, etc.



Ames No. 13 Dial Comparator features flat-ground, cast-iron base of ample size for using V-blocks and locating fixtures for checking rounds, flats and odd shapes. Also, the No. 13 can be fitted with a fine adjustment for close setting. Accurately adjustable bracket holds any Ames Micrometer Dial Indicator.

Ames No. 130 Dial Comparator is designed especially for inspecting comparatively large parts. For this reason, the flat-ground steel base, the adjustable indicator support on which can be mounted any Ames Micrometer Dial Indicator, and the upright column are proportioned to suit the user's particular requirements.

Send us your Quality Control job specifications, and we will supply complete details and proposal without obligation.

Representatives in principal cities. B. C. AMES CO. *25 Ames Street Waltham 54, Mass.*

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

Continued

GW 310 Hot Work H21
Great Western Steel Co., Inc.

GW 350
A fast finishing water hardening alloy tool steel, especially resistant to galling, seizing or pickup; shallow hardening with dense hard surface backed by tough core. Contains C 1.35, Mn 0.20 to 0.40, Si 0.40 to 0.50, W 3.00 to 4.00. Great Western Steel Co., Inc.

GW 422 Mirycal S1
Great Western Steel Co., Inc.

GW 515
An air-hardening hot-work die steel. Has high degree of toughness and resistance to abrasion; fo use in nonferrous industry. Contains C 0.35, Mn 0.25, Si 1.00, Cr 5.00, W 5.00, Mo 0.20. Great Western Steel Co., Inc.

GW Cold Header W2 (1.00 C)

GW Extra W1 (1.00 C)

GW "CVM" A2

GW "CW Oil" O1

GW Pavement Breaker W1 (0.80 C)

GW Regular W1 (0.85 C)
Great Western Steel Co., Inc.

GW Rema
A dead-soft very low-carbon steel which hobs easily. Suitable for making deep cavity molds for plastics industry. Contains C 0.05, Mn 0.20, Si 0.10. Great Western Steel Co., Inc.

GW Remalloy
An intermediate mold steel for the plastics industry. Can be easily hobbed and possesses good core strength. Contains C 0.10, Mn 0.50, Si 0.40, Cr 0.65, Ni 1.50. Great Western Steel Co., Inc.

GW Silver Stripe T1

GW Solid Drill W1 (0.80 C)

GW Special W1 (1.20 C)
Great Western Steel Co., Inc.

GW Speedalloy
A solid cast alloy for boring, facing turning, etc. Contains C 2.00, Cr 32.00, W 18.00, Co 48.00. Great Western Steel Co., Inc.

GW Superkut T4
Great Western Steel Co., Inc.

GW Vancro
A tough, water-hardening chrome vanadium tool steel. Contains C 0.45, Mn 0.70, Si 0.25, Cr 1.00, V 0.15. Great Western Steel Co., Inc.

CABLE-LINK

CABLE CONVEYOR SYSTEMS

will "Button-up" your Materials Handling Problems Quickly and Economically!

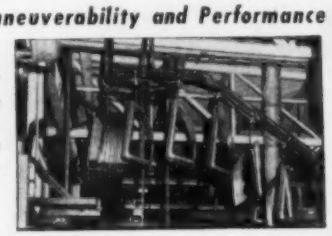
This is a "CABLE LINK" with Buttons

STRONG, DURABLE, PREFORMED PLOW STEEL

Sound, ingenious engineering concepts mark C-L conveyor systems as phenomenally brilliant achievements of this materials handling age. Simplicity, dependability and superiority in performance have won approval and acceptance for C-L Systems in every branch of industry. Today, CABLE-LINK offers Cable Conveyor models superior to 2", 3" and 4" chain installations. Lightweight or heavy duty, the conveyor with CABLE for your job is best ABLE!

Proving Superior Maneuverability and Performance

Dip and turn shown on C-L System in "big-three" automotive-supplier plant. Limited space, cumbersome load are no obstacles to C-L methods.



DEPENDABILITY!

Brackets exert 360 pressure on "buttoned" ends of "CABLE-LINKS". Trolley becomes immovable regardless of "pull-load."

NO MOVING PARTS BELOW THE RAIL!
LITTLE FRICTION... NO WEAR!
MINIMUM MAINTENANCE REQUIRED
SIMPLE TO ASSEMBLE QUICKLY INSTALLED!

Write today for brochure giving complete details.

CABLE-LINK CORPORATION
20175 JOHN R STREET • DETROIT 3, MICHIGAN

H

H 4 Special O2
Wm. Jessop & Sons Ltd.

H-9 Extra W- (0.90 C)
Carpenter Steel Co.

H 33 A2

H 39 L7

H 42 D2

H 50 H13
Wm. Jessop & Sons Ltd.

H.A.W. H11
Darwin & Milner, Inc.

H & R 1 T1

H & R 2 T2

H & R 3 T3

H & R 4 T5

H & R 7 M3
Houghton & Richards, Inc.

H & R 8
Used for chipping chisels, caulking tools, rivet sets, shear blades, etc. Contains C 0.58 to 0.63, Mn 0.60 to 0.80, Si 1.70 to 2.00, Mo 0.40 to 0.50, V 0.15 to 0.25. Houghton & Richards, Inc.

H & R 8M S5

H & R 14 T8
Houghton & Richards, Inc.

H & R 15
For zinc dies for die casting zinc base alloys. Contains C 0.50, Mn 0.65, Si 0.25, Cr 0.95, V 0.20. Houghton & Richards, Inc.

H & R 19 O2
Houghton & Richards, Inc.

H & R 44
For intermediate high speed steel applications where toughness is of more importance than resistance to abrasion. Contains C 0.80, Mn 0.30, Cr 4.10, Mo 4.25, V 1.10, Si 0.25. Houghton & Richards, Inc.

H & R 45
Similar to the M-2 type of molybdenum high speed steel except that the carbon content is lower to provide greater toughness where maximum hardness is not required. Contains C 0.65. Houghton & Richards, Inc.

H & R 50
For drills, reamers, taps, broaches, milling cutters, end mills, etc. Contains C 0.57, Mn 0.25, Si 0.30, W 18.00, Cr 4.10, V 1.15. Houghton & Richards, Inc.

H & R 55
A die casting die steel with great resistance to heat checking and wash. Contains C 0.35, Mn 0.25, Cr 5.25, W 5.25, Mo 0.20, V 0.20. Co 0.50, Si 0.90. Houghton & Richards, Inc.

H & R 57 M2
Houghton & Richards, Inc.

H & R 59
For shanks for carbide tipped drills and reamers, pipe taps, thread chasers, small drills, etc. Contains C 0.88, Mn 0.30, Si 0.25, Cr 4.10, V 1.82, Mo 4.25. Houghton & Richards, Inc.

H & R 60
For taps, reamers, broaches, blanking dies, etc. Contains C 1.20, Mn 0.27, Si 0.26, Cr 0.65, Mo 0.25, W 1.60. Houghton & Richards, Inc.

H & R 61 D5

H & R 80 A2
Houghton & Richards, Inc.

H & R 85
A shock tool steel for die casting, dies, cold cutters, chipping chisels, shear blades, punches, etc. Contains C 0.50, Mn 0.80, Si 0.25, Cr 0.95, V 0.20. Houghton & Richards, Inc.

H & R 150 L6

H & R 225 S1
Houghton & Richards, Inc.

H & R 434
For machining abrasive materials, such as plastics, scaled materials, and non-ferrous metals. Contains C 1.18, Mn 0.30, Cr 4.10, Mo 4.25, V 3.15, Si 0.25. Houghton & Richards, Inc.

H & R 444
Its 4 pct Vanadium content gives it good cutting and abrasion resisting properties. Contains C 1.40, Mn 0.30, Cr 4.10, Mo 4.25, V 4.15, Si 0.25. Houghton & Richards, Inc.

H & R 445
For applications requiring extreme abrasive action and high operating temperature. Contains C 1.50, W 13.50, Cr 4.50, V 4.75, Co 5.00, Mo 0.50. Houghton & Richards, Inc.

H & R Brake Die
Furnished heat-treated and low-annealed to Bhn 248/293. Contains C .50, Mn 1.00, Cr .95, Mo .20. Houghton & Richards, Inc.

H & R Carbon W1

H & R Cobalt T4

H & R Cobalt Moly M36
Houghton & Richards, Inc.

H & R Gold Label
For drawing dies, finishing tools of all types. Contains C 1.33, Mn 0.35, Si 0.49, P 0.023, S 0.015, Mo 0.35, W 4.23. Houghton & Richards, Inc.

H & R Heading Die Steel
Contains C 1.00, Mn 0.20 to 0.30, Si 0.15 to 0.25, S 0.014, P 0.015. Houghton & Richards, Inc.

H & R Hot Work
For extrusion dies in brass and copper, hot forming dies, hot heading tools and swedging dies, shear blades and cut-offs for hot material. Contains C 0.30 to 0.35, Si 0.20 to 0.35, Cr 3.00 to 3.50, V 0.30 to 0.50, W 10.00 to 11.50. Houghton & Richards, Inc.

H & R Hot Work 2 H21
Houghton & Richards, Inc.

H & R Hot Work 4
For bull dies, gripper dies, heading dies for rivets, etc. Contains C 0.90 to 1.05, Mn 0.30 to 0.40, Si 0.30 to 0.40, Cr 3.70 to 4.10, S and P 0.30 max. Houghton & Richards, Inc.

H & R Hot Work 5 H11

H & R Hot Work 5V H13

H & R Hot Work 6 H12
Houghton & Richards, Inc.

H & R Hot Work 7
An air hardening, non-deforming die steel with high shock resistance and moderate hot working properties. Contains C 0.55, Mn 0.30, Cr 5.00, W 1.20, Mo 1.20, Si 0.95. Houghton & Richards, Inc.

H & R K D3

H & R K2 D2
Houghton & Richards, Inc.

Turn Page

FRAY VERSATILITY
MOVES WORK FASTER!
Fray NO. 10RH
UNIVERSAL RAM • TURRET TYPE •
VERTICAL & HORIZONTAL
MILLING MACHINE
Speed up production by cutting job transfers with the versatile Fray 10-RH. This all-purpose milling machine performs an unequalled range of operations, cuts idle machine time and produces more work per man hour. It machines at any angle—vertical, horizontal or both. It mills, drills or bores at any angle. On any single piece of precision work requiring a variety of operations it is easier to reset the Fray than to transfer the work. For faster jobs, done better at less cost—investigate the easy to operate Fray 10-RH. A High Precision Tool.
FRAY "ALL-ANGLE" HEAD TYPE 4
For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.
Overall Height 7'
Write for Details and Specifications
Bulletin 10
All-Angle
FRAY MACHINE TOOL CO.
515 WEST WINDSOR ROAD, GLENDALE 4, CALIFORNIA

MAGICIANS

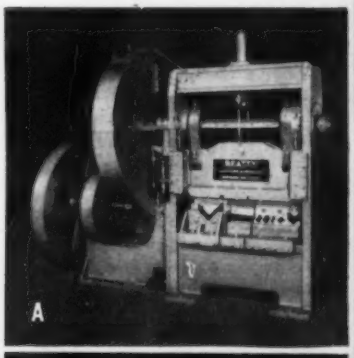
We don't pull rabbits out of hats. Our specialty is designing and building machines that work like "magic" in solving many heavy metal working production problems. The machines shown are typical examples. One of them may be just the answer for your personal production problem. If not, our broad experience in varied fields of the metal working industry enables us to design and build the ideal machine to meet your specific demands.

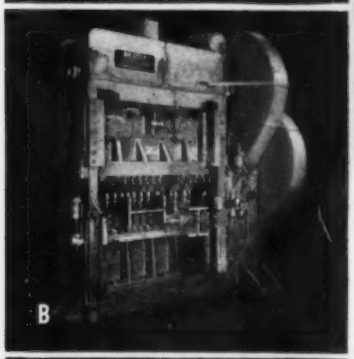
A. BEATTY Guillotine Bar Shear for "short order" shearing of bars, angles, rounds and squares.

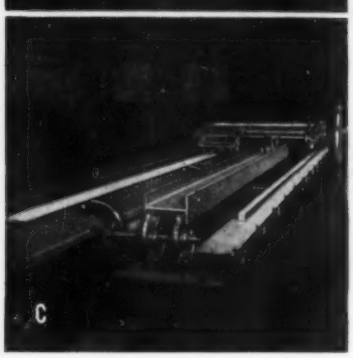
B. BEATTY Guillotine Beam Punch. Punches webs and flanges in "I" beams from 6 to 30 inches.

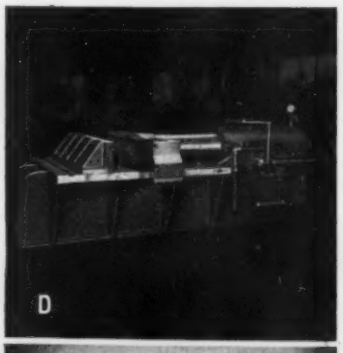
C. BEATTY Spacing Table handles web and flange punching without roll adjustment.

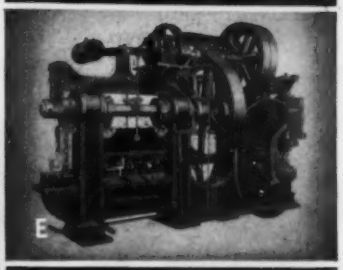
D. BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging and bending.

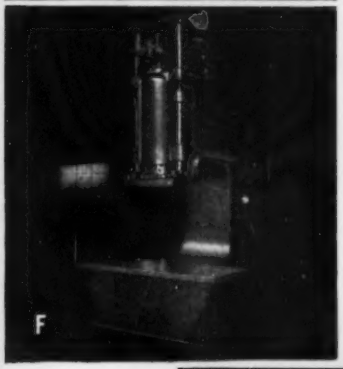

A


B


C


D


E


F

BEATTY
MACHINE & MFG. CO.
HAMMOND • INDIANA

E. BEATTY CoPunShear, one unit that does coping, punching and shearing without changing tools.

F. BEATTY Gap Type Press for forming, bending, flanging and pressing. Capacity 250 tons.

—Tool Steels—

Continued

H & R K-2L
For applications requiring great shock and abrasion resistance. For shear blades, punches and dies. Contains C 0.85, Ni 1.00, Mo 0.45, Cr 11.50, V 0.30. Houghton & Richards, Inc.

H & R K 3
Used in applications involving abrasive wear, such as dies, molds liners or wear plates, and for high grade cold work dies, such as lamination dies, etc. Contains C 2.40, Mn 0.40, Si 0.40, Cr 12.75, V 4.00, Mo 1.10. Houghton & Richards, Inc.

H & R K 4
Used for machining highly abrasive materials such as scaled and sandy castings, stainless iron and steel, plastics and non-ferrous metals. Contains C 1.40, Mn 0.30, Si 0.25, Cr. 4.10, V 4.15, Mo 4.25. Houghton & Richards, Inc.

H & R Moly Van
For blanking dies and punches, broaches, cut off tools, twist drills, etc. Contains C 0.82, Cr 4.00, Mo 9.00, V 2.20. Houghton & Richards, Inc.

H & R Molyhi M1
Houghton & Richards, Inc.

H & R Multimold
For plastic molding dies, compression or injection, subject to high mold pressure. Contains C 0.35, Si 0.45, Mn 0.70, Cr 0.80, Mo 0.30. Houghton & Richards, Inc.

H & R MY-A
An oil hardening chisel steel. Contains C 0.40 to 0.45, Mn 0.30, Si 1.40 to 1.50, Cr 1.40 to 1.50, V 0.20 to 0.30. Houghton & Richards, Inc.

H & R Oil Hardening
For cold forming dies and punches, stamping, blanking and trimming dies, etc. Contains C 0.90 to 1.00, Mn 0.90 to 1.00, Si 0.20, Cr 0.50 to 0.60. Houghton & Richards, Inc.

H & R Piston
For special pistons for pneumatic tools. Contains C 1.14, Mn 0.32, Cr 0.58. Houghton & Richards, Inc.

"Acheson, if this works, we'll make you assistant vice-president in charge of employment and training.

H & R Plastic Mold
A low carbon 4½ pct chromium air-hardening hobbing die steel furnished to 105 max. Brinell. Contains C 0.07, Mn 0.40, Si 0.25, Cr 4.50, Mo 0.45. Houghton & Richards, Inc.

H & R Plastic Mold B
An oil hardening steel with an annealed hardness of 100 max. Bhn, for ease in cold hobbing. Contains C 0.06, Mn 0.30, Si 0.15, Cr 1.00, Mo 0.25 and Boron added. Houghton & Richards, Inc.

H & R Plastic Mold C
A low carbon, dead soft steel furnished to 90 max. Brinell. Houghton & Richards, Inc.

H & R Silico S2

H & R Super Cobalt T6
Houghton & Richards, Inc.

H & R Super Molyhi
Used for turning tools for machining hard materials such as chilled iron, cutters, reamers, etc. Contains W 1.30 to 1.80, Mo 8.00 to 9.00, V 1.20 to 1.30, Co 4.50 to 5.25, Cr 3.50 to 4.00. Houghton & Richards, Inc.

H & R Tungsten OH O1

H & R Vanadium W2 (1.00C)
Houghton & Richards, Inc.

H Brand O2
Darwin & Minler, Inc.

H. S. C. 6-6-2
A molybdenum high-speed steel for boring and turning tools, chasers, cutters, etc. Contains C 0.80, Mn 0.25, Si 0.30, Cr 4.00, W 5.75, Mo 5.00, V 1.50. Holyland Steel Co., Inc.

H. S. C. 18-4-1
An 18 pct tungsten high-speed steel for boring and chasing tools, cutters, turning tools, etc. Contains C 0.70, Mn 0.20, Si 0.30, Cr 4.00, W 18.00, V 1.00. Hoyland Steel Co., Inc.

H. S. C. 33
A hot-work steel especially recommended for aluminum diecasting. Contains C 0.35, Mn 0.35, Si 0.90, Cr 4.75, W 1.10, Mo 1.50, V 0.25. Hoyland Steel Co., Inc.

H. S. C. 265
High carbon, high chrome abrasive resistant tool and die steel. Can be hardened in air or oil; for production runs in blanking, drawing, forming, etc. Contains C 1.60, M 0.30, Si 0.30, Cr 12.00, Mo 0.80, V 0.20. Hoyland Steel Co., Inc.

H. S. C. 280
A silico-manganese moly shock resisting punch and chisel steel. Contains C 0.50, Mn 0.70, Si 1.50, Mo 0.35. Hoyland Steel Co., Inc.

H. S. C. 310
A W 10.00 hot-work steel suitable for brass forging dies, hot forming dies, hot swaging dies, etc. Contains C 0.30, Mn 0.25, Si 0.30, Cr 3.25, W 10.00, V 0.35. Hoyland Steel Co., Inc.

H. S. C. 313
A hot-work die steel highly resistant to abrasion; for hot punching, forming, extruding, etc. Contains C 0.35, Mn 0.30, Si 0.30, Cr 3.00, W 13.50. Hoyland Steel Co., Inc.

H. S. C. 350
A fast-finishing steel; for turning chilled rolls, brass cutting, cold extru-

Turn Page

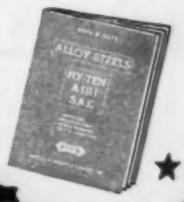
ANNOUNCING . . .

WHELCO **M**

OIL HARDENING TOOL STEEL

WL introduces *"Whelco"* – a new tool steel of M grade – a new steel of maximum toughness, hardness and strength – a steel to assure maximum results at low cost! *"Whelco"* offers great penetration of hardness, great toughness at high hardness, wide hardening range, fine grain structure, and desirable non-deforming characteristics. *"Whelco"* has good forging properties and is readily machinable in the annealed condition. All **WL** warehouses stock *"Whelco"* M tool steel in a wide variety of flats and squares. Call your nearest **WL** man for a trial order – the results will speak for themselves!

***WL** steels are metallurgically constant. This guarantees uniformity of chemistry, grain size, hardenability – thus eliminating costly changes in heat treating specifications.*

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

WHEELOCK, LOVEJOY & COMPANY, INC.

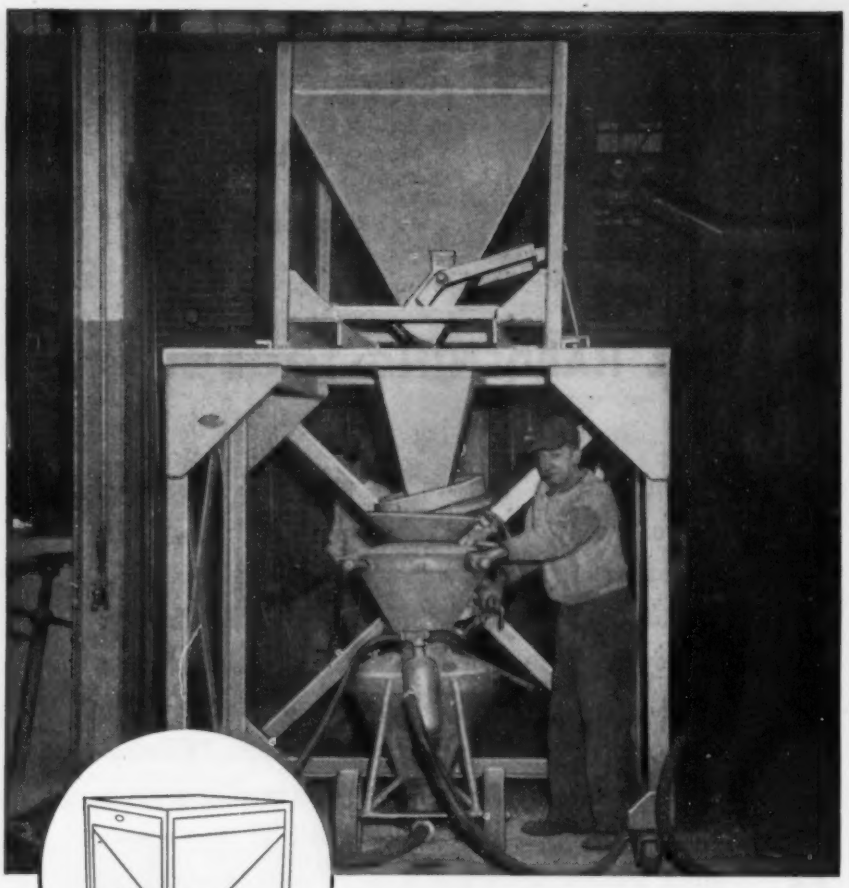
Warehouse Service

CAMBRIDGE • CLEVELAND
CHICAGO • HILLSIDE, N. J.
DETROIT • BUFFALO
CINCINNATI

In Canada
SANDERSON-NEWBOULD, LTD., MONTREAL

HY-TEN and AISI

126 Sidney St., Cambridge 39, Mass. and Cleveland • Chicago • Detroit Hillside, N. J. • Buffalo • Cincinnati



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With PENN IRON SPECIAL EQUIPMENT

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

For Further Information Write:

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

PENN IRON WORKS, INC.

READING, PENNSYLVANIA

—Tool Steels—

Continued

sion dies, etc. Contains C 1.30, Mn 0.30, Si 0.45, W 3.50. Hoyland Steel Co., Inc.

H. S. C. 422
Alloy shock resisting tool steel; for punches, shear blades, boiler makers' tools. Contains C 0.50, Mn 0.25, Si 0.20, Cr 0.95, W 1.00, Mo 0.20. Hoyland Steel Co., Inc.

H. S. C. 515
An air-hardening hot-work die steel. Has high degree of toughness and resistance to abrasion; for use in nonferrous metal industry. Contains C 0.35, Mn 0.25, Si 1.00, Cr 5.00, W 5.00, Mo 0.20. Hoyland Steel Co., Inc.

H. S. C. Alloy Shoe Die
A chrome molybdenum steel with good wearing properties. Contains C 0.50, Mn 0.60, Cr 0.60, Mo 0.40. Hoyland Steel Co., Inc.

H. S. C. Cobalt 5
A tungsten-cobalt high-speed steel capable of retaining red hardness at elevated temperatures; for turning and boring locomotive tires, broaches, chasers, cutters, etc. Contains C 0.70, Mn 0.25, Si 0.30, Cr 4.00, W 18.00, Mo 0.50, Co 5.00, V 1.00. Hoyland Steel Co., Inc.

H. S. C. Cold Header
A steel specially adapted for cold-heading purposes. Contains C 0.95, Mn 0.30, Si 0.30. Hoyland Steel Co., Inc.

H. S. C. Cutlery
Specially suited for pocket knives, carvers and cutlery of all types. Contains C 1.10, Mn 0.20, Si 0.25. Hoyland Steel Co., Inc.

H. S. C. CVM
An air-hardening tool and die steel for blanking, trimming, forming, etc. Contains C 1.00, Mn 0.70, Si 0.20, Cr 5.00, Mo 1.10, V 0.25. Hoyland Steel Co., Inc.

H. S. C. CW Oil
Oil hardening, nondeforming tool and die steel. Contains C 0.90, Mn 1.10, Si 0.35, Cr 0.50, W 0.50. Hoyland Steel Co., Inc.

H. S. C. Overcoat Axle
Straight carbon steel. Contains C 1.00, Mn 0.25, Si 0.15. Hoyland Steel Co., Inc.

H. S. C. Pavement Breaker
Specially developed for pavement breaker tools. Contains C 0.65, Mn 0.30, Si 0.10. Hoyland Steel Co., Inc.

H. S. C. Regular
Regular quality water-hardening carbon tool steel for general purposes. Contains C as desired, Mn 0.30, Si 0.30. Hoyland Steel Co., Inc.

H. S. C. Shoe Die
A straight carbon steel. Contains C 0.90, Mn 0.35, Si 0.15. Hoyland Steel Co., Inc.

H. S. C. Solid Drill
A straight-carbon drill tool steel. Contains C 0.85, Mn 0.30, Si 0.10. Hoyland Steel Co., Inc.

H. S. C. Special
Special quality water-hardening carbon tool steel for general purposes. Contains C 1.00 to 1.10, Mn 0.30, Si 0.30. Hoyland Steel Co., Inc.

H. S. C. SS Extra
Extra quality water hardening carbon tool steel for general purposes. Contains C 1.00 to 1.10, Mn 0.30, Si 0.30. Hoyland Steel Co., Inc.

H. S. C. Vancro
A tough, water-hardening chrome vanadium tool steel. Contains C 0.45, Mn 0.70, Si 0.25, Cr 1.00, V 0.15. Hoyland Steel Co., Inc.

H. V. Blue Chip

H. W. D. 1 H12

H. W. D. 2 H11

H. W. D. 3 H13
Firth Sterling Inc.

H. W. D. Mod.
An air hardening, non-deforming die steel with excellent toughness. Contains C 0.55, Si 1.00, W 1.40, Cr 5.25. Firth Sterling Inc.

H.W.S. H12
Darwin & Milner, Inc.

Halcomb 218 H11
Crucible Steel Co. of America

Halcomb 440 T6

Halcomb 999 T8
Hawkridge Brothers Co.

Hampden D3
The Carpenter Steel Co.

Hardnair A2
Atlantic Steel Corp.

Hardtem
A C 0.55 Mn-Cr-Mo-V prehardened steel for die blocks and inserts. Heppenstall Co.

Hargus
An oil hardening nondeforming steel for punching and blanking dies. Agawam Tool Co.

Havoc S2
Simonds Saw and Steel Co.

Hawk 777
An oil-hardening steel. Extra tough, high impact value, with high hardness. Contains C 0.70, Mn 0.80, Si 0.25, Mo 0.70. Hawkridge Brothers Co.

Hawk 977
An oil-hardening steel for rivet punches. Extra tough, high impact

Turn Page

"Whom shall I say is waiting to see him in vain?"

Differentials by FAIRFIELD

—a plus value in any product!

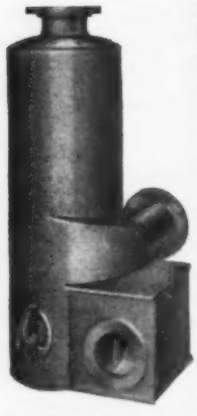
Tractors . . . Road Graders . . . Lift Trucks . . . Street Sweepers . . . Road Rollers . . . Power Shovels . . . Trucks and Buses all benefit from Fairfield's 33 years of specialized experience in building complete *differential gear units* for powered vehicles.

If you use DIFFERENTIALS in the product you build, we believe it will pay you as it has others to check with Fairfield on all of your requirements. Fairfield offers (1) Mass Production Economy, (2) Unexcelled Quality, (3) Dependable Service, (4) Expert Engineering Recommendations. YOUR INQUIRY WILL RECEIVE PROMPT ATTENTION.

FAIRFIELD MANUFACTURING CO.
2319 So. Concord Road
LAFAYETTE INDIANA

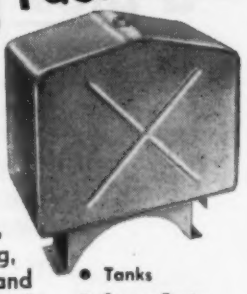
For FINE GEARS AND DIFFERENTIALS

Contract Manufacturing Facilities



Whatever your requirements in sheet, plate and alloy fabrication, Kirk & Blum can produce for you . . . economically and quickly.

Complete facilities to ½" capacity for square and rotary shearing, braking, forming, rolling, punching, riveting, welding, grinding, drilling, and finishing sheets and light plates and structurals. For complete details, write for literature on fabrication facilities and experience or send prints to:



- Tanks
- Spare Parts Boxes
- Panel Boards
- Machine Bases, Pedestals and Frames
- Hoppers
- Electrical Enclosures
- Guards
- Rolled Steel Rings
- Racks • Pans
- Stampings
- Louvre Panels
- Cabinets

Write for NEW BULLETIN

This 40 page comprehensive booklet shows typical examples of Kirk & Blum fabrication, complete facilities of plant and equipment for jobs ranging from one unit to thousands.

THE KIRK & BLUM MANUFACTURING COMPANY
3200 FORRER STREET • CINCINNATI 9, OHIO

KIRK AND BLUM
METAL FABRICATION

—Tool Steels—

Continued

value, with high hardness. Contains C 0.90, Mn 0.80, Si 0.25, Mo 0.70. Hawkridge Brothers Co.

Hawk Brand W1 (Gr. 2)

Hawk Cold Header Die W1 (Gr. 2)
Hawkridge Brothers Co.

Hawk H Roll Steel
A water-hardening improved roll steel. Contains C 0.85 to 1.10, Mn 0.30 to 0.60, Si 0.15 to 0.30, Cr 1.00 to 1.50, V 0.15 to 0.30. Hawkridge Brothers Co.

Hawk Impacto
A water-hardening steel, for silverware blanking and striking dies. Deep hardening. Fine grain. Contains C 0.90 to 1.10, Mn 0.30 to 0.40, Si 0.40 to 0.50. Hawkridge Brothers Co.

Hawk Prefak O1

Hawk Special W1 (Gr. 1)

Hawk Vanadium W2
Hawkridge Brothers Co.

Haynes Stellite
Trade-mark name given a series of cast alloys of Co, Cr and W, used as a cutting tool material—No. 19, No. 3, Star J-Metal and 98M2. Haynes Stellite 98M2 is used at highest cutting speeds, with longer life between grinds; heavier roughing cuts, with coarse feeds; used for machining steel cast and malleable iron, brass, bronze, etc. Haynes Stellite Co.

Hi-Mo M1
Firth Sterling Inc.

Hi-Run
A high chrome, high carbon steel. Contains C 1.50 to 1.60, Mn 0.35, Si 0.40 to 0.50, Cr 11.50 to 12.50, Mo 0.75 to 0.90, V 0.25 to 0.35. Kloster Steel Corp.

Hi-Van
A hot work steel containing C 0.40, Si 1.10, Cr 5.25, Mo 1.20, V 0.90. Peninsular Steel Co.

Hickory No. 7 S1
Jamison Steel Corp.

Hiflex
A special purpose alloy steel for machine parts, tools and dies. A highly fatigue resistant alloy. Gulf Steel Corp.

High Production D2
A. Milne & Co.

High Speed T-1

High Speed T1
Faitoute Iron & Steel Co., Inc.

High Speed Drill Rod T1
Pittsburgh Tool Steel Wire Co.

HMHS M1
Bethlehem Steel Co., Inc.

Hobalite
A water hardening steel, for mold dies, etc. Contains C 0.05, Mn 0.15, Si 0.02, P 0.010, S 0.010. Agawam Tool Co.

Hodi
A hot work die steel containing Cr, W and V. Contains C 0.28. Atlas Steels Ltd.

Hollobar
Oil-hardening forged tool steel tubing containing C 1.00, Si 0.30, Cr 1.50, Mo 0.60. Diehl Steel Co.

Hotform 1 H12

Hotform 2 H11

Hotform 3 H12
Vanadium-Alloys Steel Co.

Hotpress
Tungsten hot work die steel with high toughness properties. Contains W 9.25, Cr 2.00, V 0.50. Vanadium-Alloys Steel Co.

Huron D3
Allegheny Ludlum Steel Corp.

Huron V
A high carbon, high chromium steel with 4% vanadium, air or oil hardening. Has very excellent abrasion resistance. Principal uses: brick mold liners and long run blanking dies. Contains C 2.50, Cr 12.00. Mo 1.00, V 4.00. Allegheny Ludlum Steel Corporation.

Hy-Ten Alloy Chisel W1

Hy-Ten "M" Temper L6

Hy-Ten Pneumatic Chisel S5
Wheelock, Lovejoy & Co., Inc.

HYCC D3
Crucible Steel Co. of America.

Hyco D3
Lehigh Steel Corp.

Hyco T4
A. Milne & Co.

Hypro D2
Swedish-American Steel Corp.

Hypro 61 D2
Boyd-Wagner Co.

Hypro 62
An oil hardening steel for blanking dies and punches; cutting hard materials and stainless steel. Has high resistance to abrasion. Boyd-Wagner Co.

Hypro 63
A high carbon high chrome steel; deep hardening, non-shrink, non-deforming. For intricate dies, odd shaped punches, rotary shears and slitting tools, etc. Boyd-Wagner Co.

HW 8
A molybdenum-base hot work steel. Bethlehem Steel Co., Inc.

Turn to Page 358

"What do you mean I'm wasting motion? I have a date every night, don't I?"

WHEN PERKINS GEARS GO IN— TROUBLE GOES OUT!

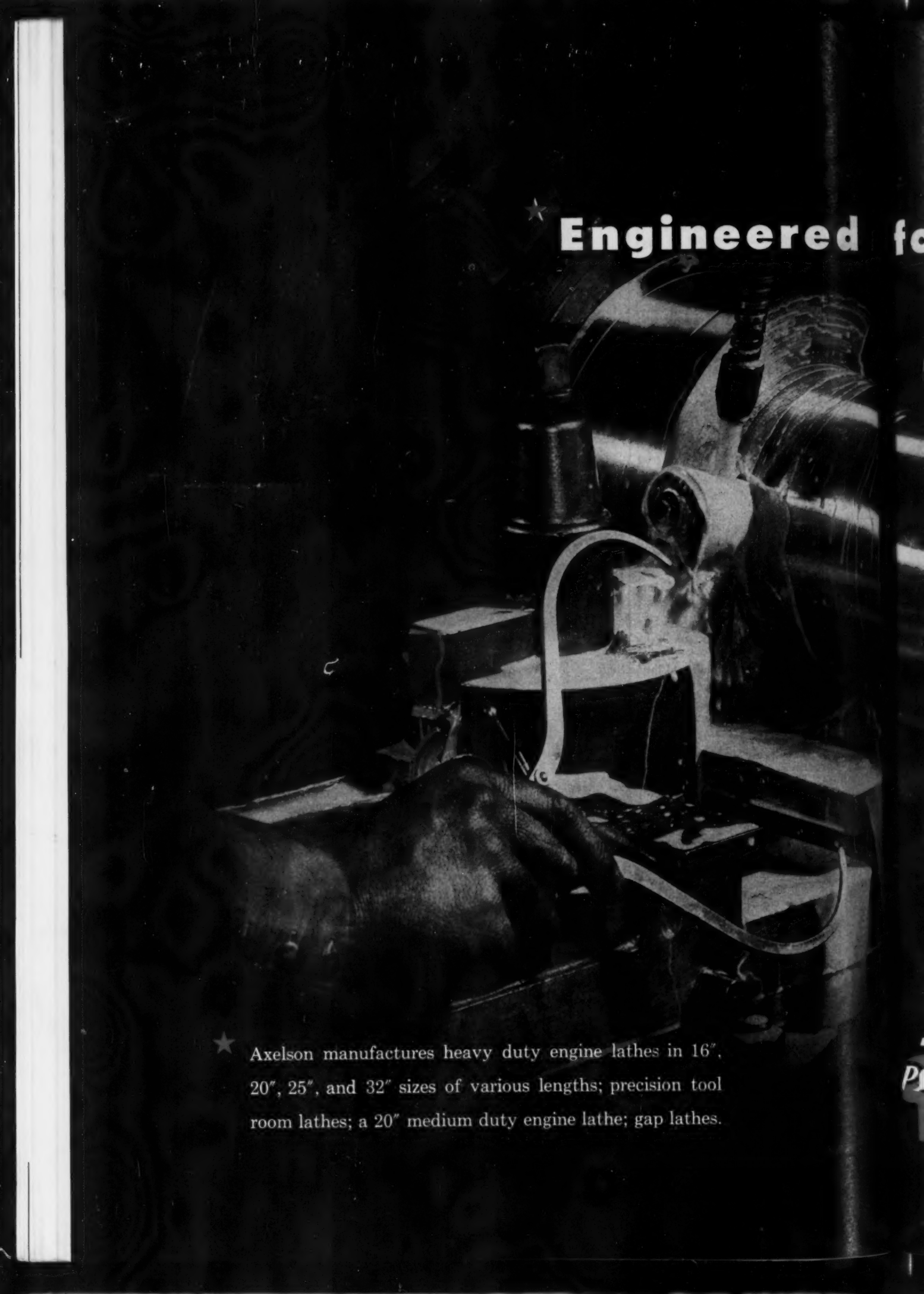
Specify Perkins custom-made Gears for trouble-free power transmission!

PERKINS MAKES to customers' specifications, in all materials, metallic and non-metallic: bevel gears, ratchets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth. Have us quote on your requirements.

* A new product is the **PERKINS PRECISION SPRING COILER.** This coiler (patent applied for) turns out precision springs—any type, shape, size from wire sizes .005 to .125. Complete data and prices upon request.

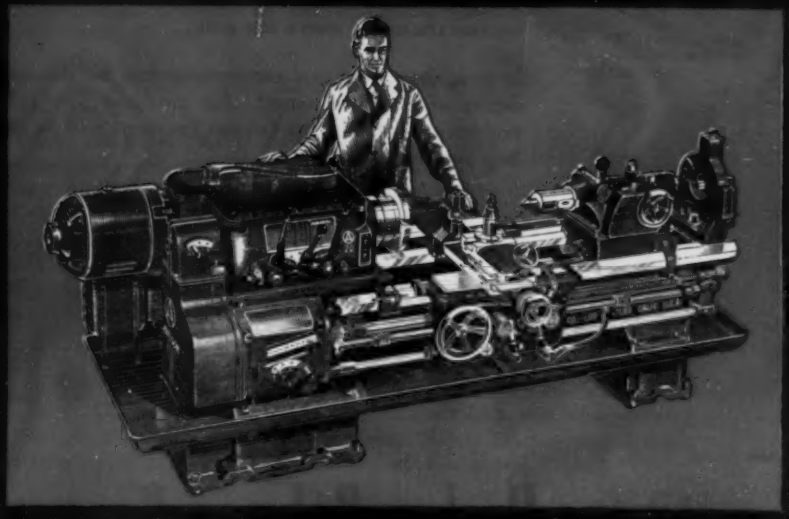
* Another new product — the **PERKINS "BENDIT 15"** — a patented metal forming machine which bends and shapes sheets, rods; strips tubing into innumerable complex as well as simple forms that would be difficult or even impossible to make by other means. Eliminates need for expensive tools or specialized skills. Height 47", net weight 200 lbs. Write us today for descriptive catalog, prices, etc.

PERKINS MACHINE & GEAR CO.
WEST SPRINGFIELD, MASSACHUSETTS


★ Engineered fo
★ Axelson manufactures heavy duty engine lathes in 16″, 20″, 25″, and 32″ sizes of various lengths; precision tool room lathes; a 20″ medium duty engine lathe; gap lathes.

d for the tough jobs, too!

From the heaviest roughing cut down to the finest precision cut Axelson lathes are designed and manufactured to give precise, accurate service. Critical dimensions "stay put" because each Axelson lathe part is produced under strict metallurgical control. Recording pyrometers keep continuous time and temperature records of hardening, tempering and normalizing operations on gears, spindles, shafts, lead screws, etc. Quality built, Axelson lathes are capable of delivering dependable, accurate work under the most difficult operating conditions.



AXELSON Lathes

PSC

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

Ⓐ

CHOSEN FIRST . . . . TO LAST!

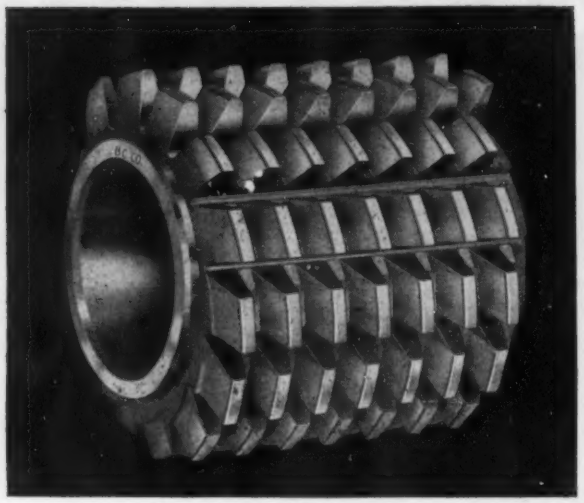
TOOL ROOM LATHES • GAP BED LATHES • HEAVY DUTY ENGINE LATHES

AXELSON MANUFACTURING COMPANY • Division of Pressed Steel Car Company, Inc. • Los Angeles 58 • New York 7 • St. Louis 16

Authorized Distributors in All Principal Industrial Centers

CLASS AA HOBS

INFLUENCE GEAR TOOTH ACCURACY



Give You a Maximum Degree of Precision in Finish Gear Hobbing

For extra precision in gear hobbing, Barber-Colman Engineers have developed Class AA hobs. They are made to consistently closer tolerances than any other hobs, helping to provide the finest in gear accuracy. In addition, they are available with taper bores to further control the accuracy of the gears. The taper bores make it easier to true the hob and eliminate the possibility of an increase in runout during the cutting operation.

Barber-Colman Class AA Hobs have proved themselves in actual production for many years. They are recommended wherever the utmost accuracy is required if other conditions warrant the use of such a fine tool.

In many cases, your gear requirements may not demand this degree of precision control. But whatever your hobbing problems may be, Barber-Colman Engineers will be glad to help you solve them.

Send For Your Copy of Hobbing Notes
. . . "Hobbing Accurate Gears"

BARBER COLMAN

Barber-Colman Company

GENERAL OFFICES AND PLANT, 711 ROCK STREET, ROCKFORD, ILLINOIS, U.S.A.

—Tool Steels—

Continued

I

Ideor S1
Darwin & Milner, Inc.

Invar
A special high nickel alloy that has a minimum coefficient of expansion for bimetal thermostats. Contains C 0.15, Mn 0.80, Si 0.25, Ni 38.00. Latrobe Steel Co.

Nnvaro 1 O1

Invaro 2 O2
Firth Sterling Inc.

Invincible W1 (Gr. 3)
Kidd Drawn Steel Co.

IXL High Speed T2
Republic Steel Corp.

J

J 34 M2

J 35 M1
Wm. Jessop & Sons Ltd.

J Hot Working Die
A medium C-Cr hot work steel. Jessop Steel Co.

J. S. Punch S1
Firth Sterling Inc.

"J" Temper RCS
A tungsten base hot work tool steel. Contains C 0.50, Cr 4.00, V 1.00, W 18.00. Vanadium-Alloys Steel Co.

J. Y.
A deep hardening wear resisting carbon-chrome tool steel for heavy sections. Carpenter Steel Co.

Jamison Special W1
Jamison Steel Corp.

JJ
A chrome hot work die steel. Jessop Steel Co.

K

K 4 Special O1

K 18 H12
Wm. Jessop & Sons Ltd.

K-46 O.H. O1
Jamison Steel Corp.

K. K. L7
Atlas Steels Ltd.

K-W
Water-hardening tungsten steel, for cold drawing dies, finishing tools, burnishing tools, etc. Has high wear resistance. Contains C 1.30, Mn 0.30, Si 0.30, W 3.50. Carpenter Steel Co.

Kalkos
A Cr-W hot work steel especially suitable for brass and aluminum extrusion and forging dies. Has excellent hot working properties. Contains C 0.30, Mn 0.35, Cr 12.00, W 12.00, V 0.90. Latrobe Steel Co.

Kapo
A high chrome, high carbon steel. Contains C 1.85 to 2.00, Mn 0.70 to 0.90, Si 0.45 to 0.50, Cr 12.00 to 12.50, W 1.80 to 2.10. Kloster Steel Corp.

Keewatin O1
Atlas Steels Ltd.

Kennametal
Brand name of a line of carbides. Kennametal, Inc.
(See "Carbides" section Jan. 8, 1953 issue.

Ketos O1
Crucible Steel Co. of America.

Keystone O1
Kidd Drawn Steel Co.

Keystone Alloy S1
Henry Disston & Sons, Inc.

King Cobalt T6
Jessop Steel Co.

Kinite D2
H. Boker & Co., Inc.

Kiski O1
Braeburn Alloy Steel Div.

Kloster Swed-Oil
A non-deforming steel containing C 0.95 to 1.00, Mn 1.10 to 1.20, Si 0.37, Cr 0.45 to 0.50, W 0.45 to 0.50. Kloster Steel Corp.

KLS-44
Cr-Ni-Mo steel for hot and cold work, die blocks, hammer dies and shear blades. Kloster Steel Corp.

Kromair A2
Republic Steel Corp.

Kromite
Shaft and gear steel. Requires no heat treatment and is machinable with ordinary high speed tools. Associated Steel Co.

Kromite Brake Die
A brake die steel. Heat treated. Free machining. Associated Steel Co.

Krosil Chisel Steel
A tough oil-hardening steel, for cold chisels. Contains C 0.50, Mn 0.90, Si 1.50, Mo 0.35. Hawkridge Brothers Co.

Kutkwik T1
Henry Disston & Sons, Inc.

L

L. C. D.
A low-carbon air-hardening steel, for shears, punches, heavy blank and trim dies, coining dies, etc. Special analysis. Pennsylvania Steel Corp.

L. P. O. H12
Latrobe Steel Co.

L. T. A.
Low temperature air hardening steel. Contains C 1.00, Mn 2.00, Cr 0.90, Mo 0.90. Pennsylvania Steel Corp.

L. T. Forging H21
L. T. L. H21
Firth Sterling Inc.

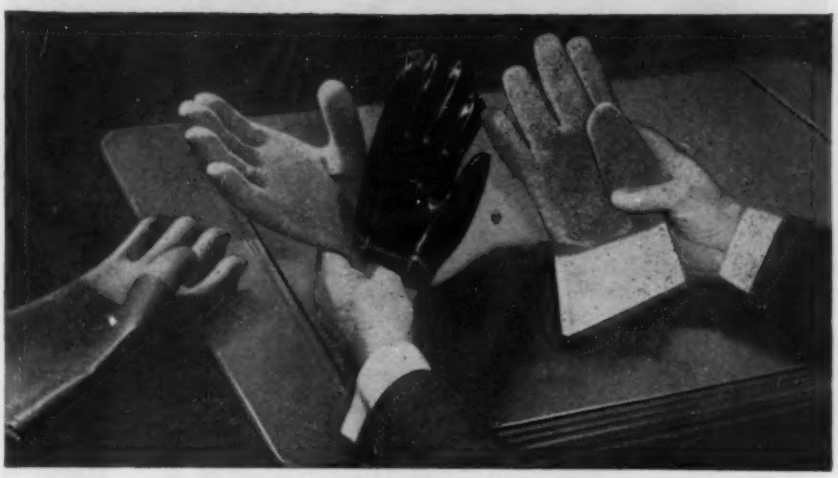
LaBelle Extra W1 (Gr. 2)
La Belle Silicon No. 2 S5
Crucible Steel Co. of America.

Leco Non-Tempering
An electric furnace alloy tool steel that hardens in water and requires no tempering or drawing. Lehigh Steel Corp.

Lehigh H D2
Bethlehem Steel Co., Inc.

Turn Page

Why does management care what gloves employees wear?



Specifying job-fitted gloves results in:

Fewer lost-time accidents.
Better work handling. Less spoilage.
Improved job attitude.
40% to 70% average saving in glove costs to companies or employees.

No. 930: Coated with extra duty red NEOX (reinforced neoprene).

CASE No. 418 — Problem: Protecting broach rotor core operator from wet broach and from rotor coolant carrying sharp slivers which caused severe cutting and puncturing.

Solution: Gloves with extra thick coating of specially reinforced neoprene. Wore 5 *times longer* than best gloves previously tested.

No. 93: Palm coated with black NEOX (reinforced neoprene).

CASE No. 198 — Problem: Handling sharp-edged sheet metal in shearing operation.

Solution: Job-fitted gloves with cut-resisting reinforced neoprene coating on palm. Proved safer, more comfortable and wore 200 hours compared with 40 hours average of canvas, leather and plastic-coated gloves.

No. 366: Coated with DUROX, a 50% longer wearing plastic. Grips wet or dry.

CASE No. 246 — Problem: Handling rough logs, sawing and stacking lumber.

Solution: Job-fitted plastic-coated gloves eliminated injuries from splinters and wore a minimum of 30 days against 2 days' wear of best quality canvas and double-palm gloves.

Our laboratory and field representatives will gladly assist on any protection problem: (Used by Republic Steel, Chevrolet, Firestone, Monsanto, Chrysler, Carnation Milk, many others.)

Sample gloves supplied without charge for testing on your operations. On request, we make recommendations and also develop special gloves where needed. Address "Safety Engineering Service, Edmont Mfg. Co., 1234 Walnut Street, Coshocton, Ohio."

Edmont job-fitted work gloves
by the world's largest maker of coated industrial gloves

You can save money...

WITH ALSIMAG® CERAMICS

HEAT RESISTANT WORK HOLDING DEVICES

Precision made for your requirements. For holding work during brazing, soldering, electronic heating. Superior resistance to repeated hot-cold shock. Proper jigs, templates or other work holding devices can speed your operations many times over. Outline your problems and let us make recommendations.

PRECISION CORES

Can be furnished to exact dimensions for precision castings. Also economical and accurate method of forming many small area holes in castings.

STRAINER OR CUT-OFF CORES

Used in the riser to form a weak joint between riser and casting. Reduces cut-off time. In many cases riser can be knocked off instead of cut off. A great time and money saver. Can be made to your specifications. Cameron Cores, Patent No. 2313517, sold to Meehanite Licensees only.

GATE TUBES

Used in casting to convey molten metal into casting without contamination.

TROUGHS

For conveying molten metals. Custom made.

STRAINER CORES

These ceramic cores fit into gate of mold, strain the metal, regulate its flow. Cleaner castings, fewer rejects. Money saver. Made in two materials:

ALSIMAG 564 (WHITE) is less expensive, gives perfect performance with lower melting point metals such as cast iron. Adequate for some cast steel applications but test this material on steel applications before adopting it as standard. Has heat resistance above that of many materials recommended for use with cast steel but we are on the conservative side.

ALSIMAG 202 (TAN) has highest heat resistance. For use with higher melting point metals such as steel.

Dies in stock on many sizes and designs. Special designs reproduced economically. Samples from our files without charge. Special samples hand made at reasonable cost.

AMERICAN LAVA CORPORATION

CHATTANOOGA 5, TENNESSEE

50TH YEAR OF CERAMIC LEADERSHIP

—Tool Steels—

Continued

Lehigh—L
A high carbon, high chromium, oil or air hardening tool and die steel. Abrasion resistant, for dies, shear blades, etc. Contains C 0.85, Si 0.35, Cr 11.50, Ni 1.05, V 0.30, Mo 0.45. Bethlehem Steel Co.

Lehigh S D3
Bethlehem Steel Co., Inc.

Lehigh S. S. T6

Lehigh XXX T2
Lehigh Steel Corp.

Lescalloy
A hollow oil hardening alloy tool steel for tools, dies and bushings. Lehigh Steel Corp.

Lestem
A special alloy tool steel that hardens in water without drawing. Lehigh Steel Corp.

Liberty
A water-hardening steel, for chaser and threading tools. Contains C 1.20, Cr 0.30, W 1.25. Hawkridge Brothers Co.

Lion W1

Lion Extra W1
Jessop Steel Co.

LMW M1
Allegheny Ludlum Steel Corp.

Lockport Special T2
Simonds Saw and Steel Co.

Ludlum 602
Silico-manganese-moly, water, or oil hardening steel, for chisels and various pneumatic tools. Good resistance to shock with moderate hardness. Contains C 0.50, Mn 0.70, Si 1.70, Mo 0.40, V 0.12. Allegheny Ludlum Steel Corp.

Ludlum 609 S5
Allegheny Ludlum Steel Corp.

Lumdie
Air hardening die steel, for die casting dies, for aluminum and white metals. Has low distortion and resists heat checking. Contains C 0.40, Mn 0.25, Si 0.95, Cr. 5.25, W 4.50. Latrobe Steel Co.

LXX T1
Allegheny Ludlum Steel Corp.

M

M-2 Dreadnought M2

M-3 Dreadnought M3
Hawkridge Brothers Co.

M-10
Air-hardening die steel resistant to wear; for coining dies, slitter blades, stamping dies, shear blades, blanking dies, gages and punches. Contains C 1.00, Mn 0.70, Cr 5.00, V 0.25, Mo 1.05. McInnes Steel Co.

M-40-T
A cast molybdenum cobalt high speed steel containing boron for cutting tools requiring high red hardness and excellent resistance to abrasion. Gorham Tool Co.

M-40-U
A cast molybdenum cobalt high speed steel containing boron for parts requiring high resistance to abrasion such as rest blades, bushings and centers. Gorham Tool Co.

M-40-U12
A cast molybdenum cobalt high speed steel containing boron for applications requiring abrasion resistance coupled with corrosion resistance. Gorham Tool Co.

M Chrome
An oil or water hardening bearing and ball race steel. Contains C 1.00, Mn 0.30, Si 0.25, Cr 1.45. Latrobe Steel Co.

M.G.R.
An air hardening, non-deforming chrome cold-work die steel with high toughness. Contains C 0.55, Mn 0.30, Si 1.00, Cr 5.00, W 1.25, Mo 1.25. Latrobe Steel Co.

M S M S5
A. Milne & Co.

M S T O2
Raven Steel & Tool Co.

M—Tungsten
A shock resisting steel. Contains C 0.50, Mn 0.30, Cr 0.90, W 1.00. Republic Steel Corp.

Magex A
Heat treated to 155,000 psi, it is ideal for pump shafts, pinions, drive shafts, worm gears, etc. Pyramid Steel Co.

Magex B
For cams, reamers, chuck jaws, etc. High hardness plus excellent ductility. Pyramid Steel Co.

Magic S5
Jessop Steel Co.

Maintenal
An electric furnace steel for wrenches, drills, boring tools, clinker bars, etc. Pyramid Steel Co.

Major T6
A. Milne & Co.

Manganal
Manganese nickel steel with high impact and abrasion resistance. Contains C 0.80, Mn 13.00, Si 0.75, Ni 3.00. Stulz-Sickles Co.

Mangano O2
Latrobe Steel Co.

Mansil O1
Henry Disston & Sons, Inc.

Marathon D3
Hawkridge Brothers Co.

Marvel
A 9.00 W hot work die steel. Vanadium-Alloys Steel Co.

Turn Page

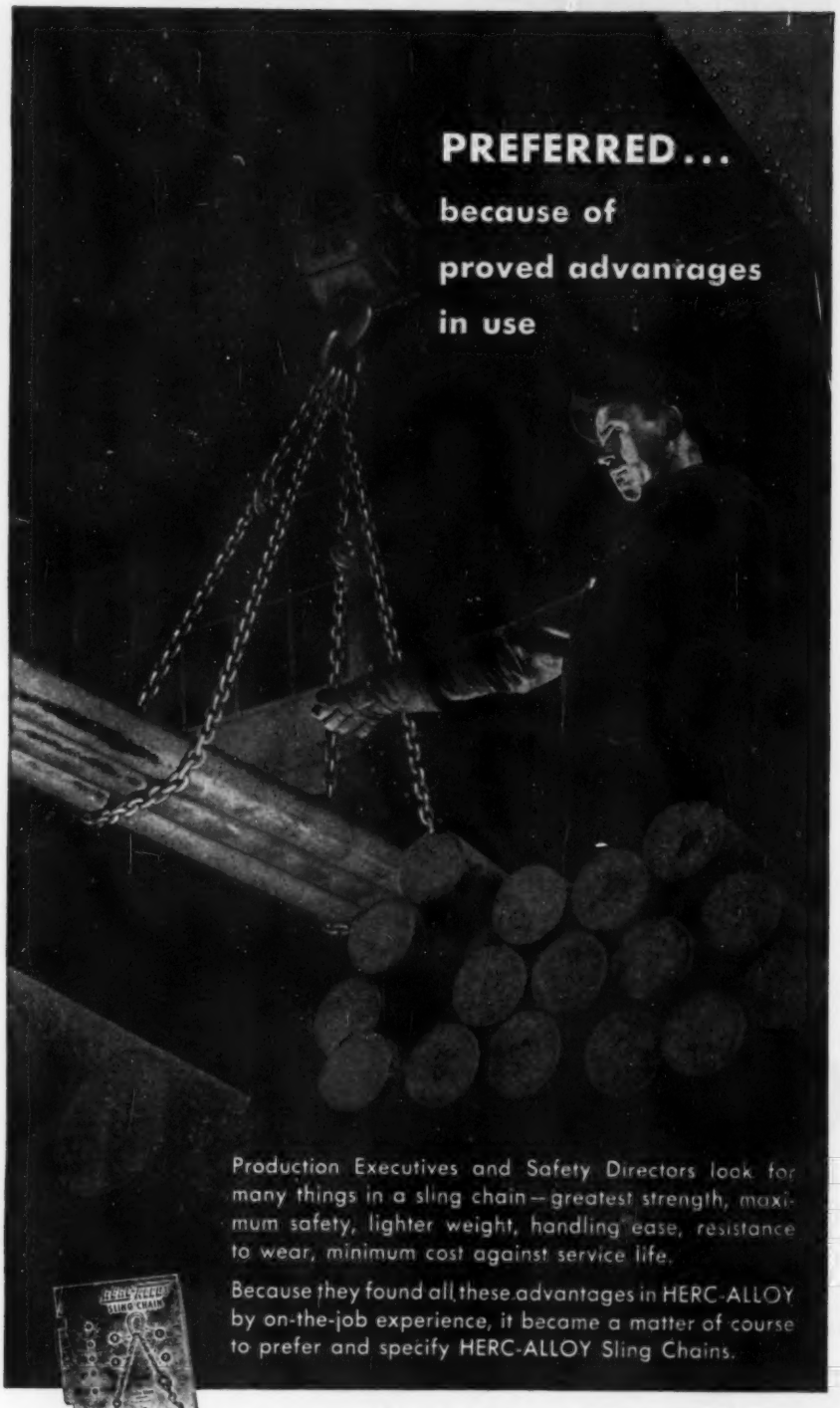
SAE SYMBOLS

Many of the tool steel brands listed here carry symbols, W1, D2, etc. These symbols replace the descriptive listings used on these brands in previous editions of the "Directory." Their purpose is to give more information about each steel than can be included in a descriptive listing. The charts on pages 308 and 309 provide approximate chemical composition, hardness, forging and heat treating data as a guide to handling these tool and die steels.

THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT

Sales Representatives
The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

HERC-ALLOY
SLING CHAINS



Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

COLUMBUS McKINNON CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corp.)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

District Offices: **New York • Chicago • Cleveland**

Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., Can., and Johannesburg, South Africa.

—Tool Steels—

Continued

Maxite T8
Columbia Tool Steel Co.

MCH
A molybdenum base, high temperature, hot work steel for forging dies, trimming dies, punches, shear blades. Has resistance to heat checking. Contains C 0.50, Mo 6.25, W 1.00, Cr 3.75, V 0.75. Latrobe Steel Co.

McInnes Alloy
High-grade hammered steel in standard grades of SAE and NE alloy steels in rounds, squares, flats, hexagons and special forgings. McInnes Steel Co.

McInnes Folder Die
Steel for brake dies and forming dies. Is very dense and stands up under high pressure. Heat treated ready for use. Contains C 0.90 to 1.05, Mn 0.25 to 0.35. McInnes Steel Co.

McInnes High-Carbon, High-Chrome
High chrome low nickel die steel; oil or air hardening, high abrasion resisting qualities; for blanking dies, broaches, deep drawing dies, forming tools, thread rolling dies and trimmer dies. McInnes Steel Co.

McInnes Machine
High-grade hammered machine steel bars; strength and toughness, easily machined; for spindles, shanks for tools, lead screws, motor shafts, piston rods and gear blanks; furnished in rounds, squares, flats, hexagons. Contains C 0.35 to 0.45. McInnes Steel Co.

McInnes-Special
A high carbon, water hardening tool steel, for special tools requiring resistance to wear. Contains C 1.00, Mn 0.25, Si 0.25. McInnes Steel Co.

McInnes Special Chrome Nickel
See Special Chrome Nickel.

McInnes—"V"
A high speed steel, for turning tools, cutters, tool holder bits, dies, etc. Containing C 0.65 to 0.75, Mn 0.20 to 0.35, Si 0.20 to 0.35, Cr 3.50 to 4.50, V 1.00 to 1.20, W 17.50 to 19.00. McInnes Steel Co.

MCL
A low carbon, molybdenum base hot work steel for high temperature service. Used for forging dies, dummy blocks, heading dies and extrusion dies. Contains C 0.30, Mo 6.25, W 1.00, Cr 3.75, V 0.75. Latrobe Steel Co.

Medusa S1
Gulf Steel Corp.

Merico
Water-hardening nontempering tool steel recommended for chisels, blacksmith tools, punches, heat-resistant tools and machine parts; fatigue, wear and impact resistance; machinable. Contains C 0.35, Mn 0.40, Si 0.64, Cr 0.77, Co 0.50, Mo 0.76, Cu 0.73. Meridian Steel Co.

Merico 2
Oil-quench nontempering tool steel excellent for shear blades, rivet sets, dies and pneumatic tools. Contains C 0.40, Mn 0.42, Si 0.62, Cr 0.77, Mo 0.75, Cu 0.75. Meridian Steel Co.

Meridian A R Steels W2
Meridian Steel Co.

Meridian Carbide High Speed Steel
A fine grade W-Co high speed steel highly recommended for cutting tools. Is abrasion and heat resistant. C 0.65, Mn 0.15, Si 0.15, Cr 4.50, W 18.00, V 2.00, Mo 0.75, Co 12.00. Meridian Steel Company.

Meridian Die "O" Steels O1
Meridian Die Steels A2
Meridian HS Steels T2
Meridian Steel Co.

Meteor
Oil hardening steel, for small taps, punches and dental burrs. Is deep hardening. Contains C 1.25, Cr 0.25, V 0.15, W 1.50. Firth Sterling, Inc.

MHV-6
A tungsten-molybdenum high speed steel with good abrasive and wear resisting properties for machining heat treated sections, castings or other hard materials. Contains C 1.03, W 6.00, Mo 6.00, Cr 4.00 V 2.50. Latrobe Steel Co.

Milnair 5 A2
A. Milne & Co.

Milo
Water hardening steel, for hand bull points, chisels, fire tools, flogging tools, shafting, etc. Contains C 0.35 to 0.45, Mn 1.00 to 1.10. Hidalgo Steel Co.

Milo 38
Water hardening steel for pneumatic tools, containing C 0.70 to 0.90. Hidalgo Steel Co.

Milvan T2
A. Milne & Co.

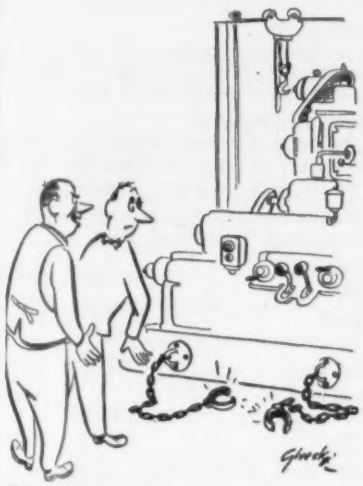
Mineor A2
Darwin & Milner, Inc.

Mirraloy
Turned ground and polished. Heat treated stress relieved, and machine straightened. Associated Steel Co.

Mirromold
Case-hardening steel designed especially for easy cold hobbing of plastic mold cavities. Contains C 0.10, Mn 0.20, V 0.10. Carpenter Steel Co.

Mirycal S1
Great Western Steel Co., Inc.

Turn Page



"You'll find me pretty tough, but I'm fair, boy."

PITTSBURGH purple

—Your Guarantee of Longer Life

GUARANTEED PITTSBURGH ARMORED GEARS

Trademark Registered U. S. Patent Office

What are ARMORED GEARS?

Gears made only by PITTSBURGH GEAR from an exclusive formula perfected by Pittsburgh engineers which covers metal, machining, and a method of heat-treating that hardens the wearing surfaces but leaves the core tough and shock-resistant.

What does this mean to YOU?

Longer gear life and fewer work stoppages. Pittsburgh **ARMORED GEARS** are guaranteed to give you five times the life of untreated gears, one to one and one-half times the life of oil-treated gears, and equal or longer life than any other gear in identical service.

POSITIVE IDENTIFICATION

Pittsburgh **ARMORED GEARS** are identified by their exclusive Pittsburgh purple protective coating which prevents corrosion. Look for "**Pittsburgh Purple**" on the gears you buy.

STANDARDIZE and SAVE

Try a Pittsburgh **ARMORED GEAR.** Then standardize on these guaranteed gears for continued savings. Send your specifications to us today for quotation on one or any quantity of gears you need. We'll give you prompt service.

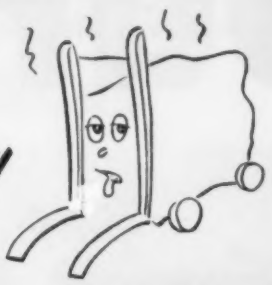
SPUR, MITRE
HELICAL
HERRINGBONE
WORM GEARS
REDUCERS
CRANE WHEELS

YOUR GUARANTEE OF LONGER LIFE

PITTSBURGH GEAR COMPANY
27th & Smallman Streets
Pittsburgh 22, Pa.
Phone: ATlantic 1-9950

subsidiary of BRAD FOOTE GEAR WORKS, INC. • CICERO 50, ILLINOIS

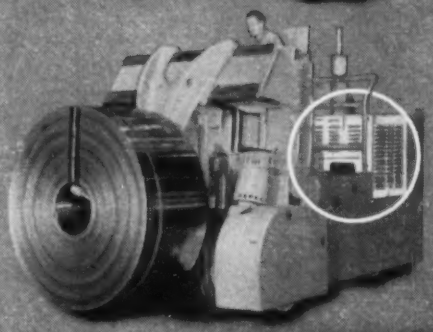
ARE YOUR ELECTRIC TRUCKS GUILTY OF "4 O'clock Letdown?"

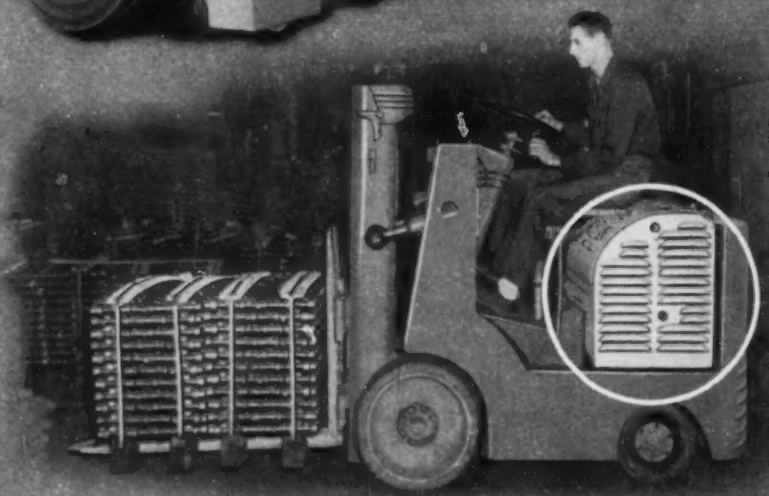


READY-POWER DRIVE

for Full Efficiency ALL THE TIME!

Only Ready-Power gives your electric trucks full efficiency for every minute of every hour . . . all day long. And because Ready-Power-equipped trucks are so easy to operate, drivers are more efficient, too. Unlimited power plus alert drivers add up to more ton-miles per hour.





Remember...Your Truck Is No Better Than Its Power

CONTINUOUS-DUTY POWER UNITS

The READY-POWER Co.

3822 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

—Tool Steels—

Continued

Misco A
Standard water hardening tool steel for track tools, chisels, etc. Contains C 0.80 to 0.85, Mn 0.25 to 0.30, Si 0.20 to 0.35. McInnes Steel Co.

Misco B
Regular water hardening tool steel, for mining and general tools. Contains C 0.70 to 0.80, Mn 0.30 to 0.35, Si 0.20 to 0.35. McInnes Steel Co.

Mix 872 Hot Die H21
Mix 873 Hot Die H12
Henry Disston & Sons, Inc.

ML T2
Allegheny Ludlum Steel Corp.

MM 6 and 6 M2
A. Milne & Co.

Mo-Chip
High speed steel, for taps, punches and similar tools, containing carbon as required, Cr 5.00, Co 2.50, V 1.00, Mo 8.00. Firth Sterling, Inc.

Mocut M1
Braeburn Alloy Steel Div.

Mogul M1
Jessop Steel Co.

Mohawk Hot Die
High tungsten, hot-work, air or oil hardening steel for shear blades, punches, cut-offs, trimmer dies, hot work dies, etc. Good resistance to heat and abrasion. Resistance to shock less than Atlas A or B. Contains C 0.50, Cr 3.50, V 0.70, W 14.00. Allegheny Ludlum Steel Corp.

Mohican M1
Atlas Steels Ltd.

Molel Alloy
A special alloy steel. Delaware Tool Steel Corp.

Molex 7
Super quality tool steel of exceptional toughness in a high degree of hardness; for shear blades and dies. Associated Steel Co.

Molite M2
Columbia Tool Steel Co.

Molva T M2
Simonds Saw and Steel Co.

Moly-8
A special purpose hot work steel. Contains C 0.60, Cr 3.60, V 1.75, Mo 8.50. Pennsylvania Steel Corp.

Moly High Speed
General purpose high speed steel. Contains C 0.80, Cr 0.40, Mo 4.25, V 1.50, W 5.50. McInnes Steel Co.

Monaca Drill Rod W1 (1.20 C)
Pittsburgh Tool Steel Wire Co.

Monark 2 S5
Atlas Steel Ltd.

Mosil S5
Vanadium-Alloys Steel Co.

MoTung M1
MoTung 652 M2
Universal-Cyclops Steel Corp.

MT6 M2
Darwin & Milner, Inc.

Mustang M2
Jessop Steel Co.

N

N C Alloy
An all-purpose oil hardening tool and die steel. Lehigh Steel Corp.

N.D.S. L6
Latrobe Steel Co.

N. N. D3
Atlas Steels, Ltd.

Nasco
A shock-resisting steel which needs no tempering; tough and hard. Does not easily chip or batter. North American Steel Co.

Nascoloy
An ideal steel for pneumatic tools which is shock-proof and needs no tempering; easily machined in annealed condition. North American Steel Co.

NBS L6
Raven Steel & Tool Co.

Neatro
A W-Mo high speed steel with high hardness, wear resistance, toughness and edge strength. Contains C 1.25, V 4.00. Vanadium-Alloys Steel Co.

Neor D3
Darwin & Milner, Inc.

New Process Cold Header W1(1.00C)
Jessop Steel Co.

Nicroman L6
Henry Disston & Sons, Inc.

Nikro M L6
Vanadium Alloys Steel Co.

Nipigon T5
Atlas Steels, Ltd.

Nitro W2 (1.00 C)
The Carpenter Steel Co.

Nitung
A special purpose hot work steel. Contains C 0.30, Cr 2.75, Mo 0.30, W 9.50, Ni 1.60. Pennsylvania Steel Corp.

Non-Pa-Reil O1
Swedish-American Steel Corp.

Non-Shrinkable O1
Vanadium Alloys Steel Co.

Nonabrade A. H. Tool Steel D2

Nonabrade Cobalt Tool Steel D5

Nonabrade O. H. Tool Steel D3

Nonchange A. H. Tool Steel A2

Noncheck Forge Die Steel H12

Nondistort O. H. Tool Steel O1

Nonerode Die Casting Steel H11

Nonexcelled Tungsten Stock Steel S1
Coulter Steel & Forge Co.

Nonspall Punch & Chisel Steel S5
Coulter Steel & Forge Co.

Novo 2 T2

Novo Superior T1

Novo Superior Vanadium T3
H. Boker & Co., Inc.

Nu-Die Casting H11
Hawkridge Brothers Co.

Nu-Pyr-Loy
A high alloy steel for pneumatic and shock tool applications. Pyramid Steel Co.

Turn Page

IN PEACE TIME
DEFENSE TIME
EVERY TIME

MAKE "Standard" YOUR SOURCE
FOR WELDED TUBING EFFICIENTLY PRODUCED!

Specially Designed
New Modern Plant with
Complete Facilities for Production of:

★ Welded Mechanical ★ Boiler and Heat Exchanger
★ Welded Stainless ★ Exclusive "Rigidized" Patterns

Complete Range of Electric Weld Tubing for
Structural, Mechanical and Pressure Applications

Here in this great new plant are the most modern and complete facilities for the manufacture of Welded Steel and Stainless Steel tubing found anywhere. Let "Standard's" specialists help you!

THE STANDARD TUBE CO.
Detroit 28, Michigan
Welded Tubing Fabricated Parts
STANDARDIZE with STANDARD — It Pays

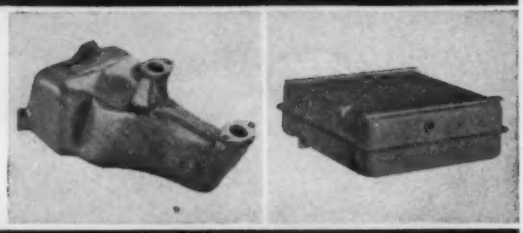
ROUND • SQUARE • RECTANGULAR • SPECIAL SHAPES
Including UPSET • FLARED • FLANGED • TAPERED

STEEL TUBING SIZES: ½" O.D. to 5½" O.D. .028 to .260 wall
STAINLESS SIZES: ⅛" O.D. to 3" O.D. .028 to .095 wall

SHEET METAL FABRICATED
TO YOUR SPECIFICATIONS

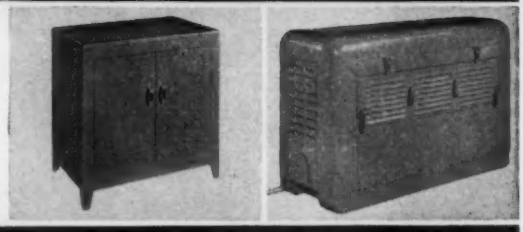
TANKS

All shapes
All sizes
1 qt. to 150 gal.



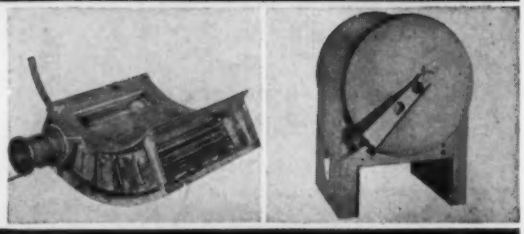
ENCLOSURES

Cabinets
Housings
Cabs



ASSEMBLIES

Ready to take their place on your equipment



SHEET METAL fabricated to customer's individual specifications. Flexible and diversified facilities are yours without capital investment.

It Pays To Make
STOLPER
Your Sheet Metal Department

—Tool Steels—

Continued

NuDie H11
NuDie V H13
Crucible Steel Co. of America

O

Ohio Die D2
Vanadium-Alloys Steel Co.

OHT O1
Darwin & Milner, Inc.

Oil Hardening
Non-shrink tool steel tubing for dies, rolls, collets, knives, etc. Contains C 1.00, Mn 1.00 max., Cr 1.50, Mo 0.20 max. Bissett Steel Co.

Oil Hardening Tool Steels O1
Detroit Steel Corp.

OILcrat O1
Marshall Steel Co.

Oilgraph O6
Allegheny Ludlum Steel Corp.

Oilhard O1
Faitoute Iron & Steel Co., Inc.

Oiltemp
Non-deforming oil hardening steel for intricately shaped dies, delicately shaped tools, etc. Contains C 0.90, Mn 1.10, Cr 0.50, W 0.50, V 0.20. Bissett Steel Co.

Oilway O1
H. Boker & Co., Inc.

OK S1
Wm. Jessop & Sons Ltd.

Olympic D2
Latrobe Steel Co.

Omega S-5
Faitoute Iron & Steel Co., Inc.

Omega S5
Bethlehem Steel Co., Inc.

Omega S5
Faitoute Iron & Steel Co., Inc.

Ontario D2
Allegheny Ludlum Steel Corp.

Orange Label W1 (1.05 C)
A. Milne & Co.

P

P-B Drill Rod
A commercial grade carbon steel drill rod. Patriarche & Bell, Inc.

P.H.-9
A special purpose hot work steel. Contains C 0.35, Cr 2.75, V 0.30, W 9.00. Pennsylvania Steel Corp.

P. H.-14
A special purpose hot work steel. Contains C 0.42, Cr 3.50, V 0.30, W 14.00. Pennsylvania Steel Corp.

P. H. Van
A special purpose hot work steel. Contains C 0.40, Si 1.10, Cr 5.25, V 0.90, Mo 1.20. Pennsylvania Steel Corp.

P. H. W.
A premium general duty hot work steel for long continuous runs under severe conditions. Contains C 0.35, Mn 1.50, Si 1.00, W 1.25, V 0.20. Pennsylvania Steel Corp.

Panther 5
A high vanadium tungsten cobalt high speed steel which has very high hardness, high abrasion resistance and good toughness. Intended for high production runs and extra duty cutting. Contains C 1.50, W 12.50, Cr 4.75, V 5.00, Co 5.00. Allegheny Ludlum Steel Corp.

Panther Spec. T4
Allegheny Ludlum Steel Corp.

Par-Exc S1
Vanadium-Alloys Steel Co.

Paragon Oil Hardening O2
Peerless A H21
Crucible Steel Co. of America.

Penair 5
An air hardening die steel. Contains C 1.00, Mn 0.60, Cr 5.25, Mo 1.10, V 0.25. Peninsular Steel Co.

Penco ACS
An air hardening type of mold steel for hobbed cavities. Contains C 0.7 max., Mn 0.40, Si 0.25, Cr 4.50, Mo 0.45. Peninsular Steel Co.

Penco OCS
A chrome alloy type of mold steel for hobbed cavities. Contains C 0.06, Mn 0.30, Cr 1.00, Mo 0.25, boron added. Peninsular Steel Co.

Penn-Air A2
Penn-Cut T1
Penn-Cut 5 T5
Penn-Cut-Moly M2
Pennsylvania Steel Corp.

Plancher
An oil hardening steel, for shear blades, punches, etc. Is shock resisting. Agawam Tool Co.

Pompton W1 (0.80 to 1.20 C)
Potomac H12
Potomac M M13
Allegheny Ludlum Steel Corp.

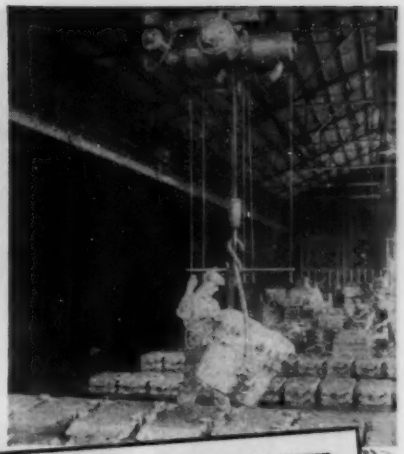
Powhatan T4
Atlas Steels, Ltd.

Turn Page

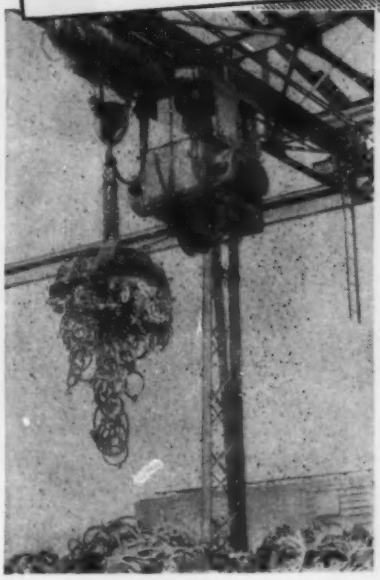
"I understand Comrade Gudenufsky has invented color television—in red, of course."

SHEPARD NILES
Floor-Operated Hoist

Operator mainly occupied with other duties. Hoist used for fast, efficient handling of relatively short hauls.



WHICH HOIST is RIGHT FOR YOUR JOB?



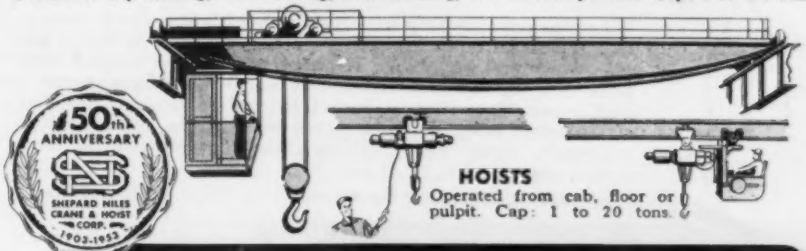
SHEPARD NILES
Cab-Operated Hoist

Operator in cab moves loads along at high speeds—occupies best vantage point for spotting or stacking materials.

Choosing the hoist that's right for your job calls for expert advice.

Let the Shepard Niles representative in your area guide you in your choice. He specializes in through-the-air handling—can help you select the hoist that best fits your job. Write Shepard Niles today for latest bulletins describing both types of hoists—and ask to have a representative stop by your office.

CRANES
Overhead: Top running, inner running, under running, floor or cab operated. Cap: 1 to 450 tons.



HOISTS
Operated from cab, floor or pulpit. Cap: 1 to 20 tons.

SHEPARD NILES
CRANE AND HOIST CORPORATION
1424 SCHUYLER AVENUE, MONTOUR FALLS, N.Y.

You're "WIRED to SATISFACTION" when you specify SENECA

TOP QUALITY WIRE

for wide range of uses! Check your needs!

- ☐ Aircraft
- ☐ Armor
- ☐ Armature
- ☐ Bobby Pin
- ☐ Bobbin Ring
- ☐ Bookbinder
- ☐ Bottle Cap
- ☐ Broom
- ☐ Brush
- ☐ Cable
- ☐ Car Seal
- ☐ Core
- ☐ Cotter Pin
- ☐ Covering
- ☐ CurtainSpring
- ☐ Drapery Pin
- ☐ Flexible Shaft
- ☐ Florist
- ☐ Fuse
- ☐ Glass Netting
- ☐ Hair Pin
- ☐ Holly
- ☐ Hook & Eye
- ☐ Lock Spring
- ☐ Piano Covering
- ☐ Picture Cord
- ☐ Pin
- ☐ Piston Ring
- ☐ Plow Steel
- ☐ Reed
- ☐ Rope
- ☐ Safety Pin
- ☐ Shaft
- ☐ Spiral Binding
- ☐ Spark Coil Core
- ☐ Stapling
- ☐ Stitching
- ☐ Stove Pipe
- ☐ Strand
- ☐ Tag
- ☐ Umbrella
- ☐ Weaving

Whatever your needs in wire . . . whether it's fine wire for weaving or heavier types for springs, etc. . . . specify SENECA for *top quality* and *uniformity!* High carbon or low carbon steel wire . . . aluminum . . . bronze. Sizes No. 40 W & M gauge (.007) and larger. Many shapes—round, half round, oval, square, flat, straightened and cut. Choice of finishes—bright, soft annealed, coppered, liquor finish, tinned, bright galvanized, oil tempered, enameled.

Consult with Seneca for all needs in High Quality Wire.

Seneca

WIRE & MFG. COMPANY • FOSTORIA, OHIO

Representatives in practically All Principal Cities

—Tool Steels—

Continued

Presneal
A special alloy, hot work, annealed steel for user's hardening up to Bhn 514 for dies and punches. Heppenstall Co.

Pressurdie 2 H12
Pressurdie 3 H13
Pressurdie 3L H11
Braeburn Alloy Steel Div.

Prestem
A special alloy, hot work, prehardened steel. Temper A—Bhn 388 to 429; temper B—Bhn 341 to 375. For dies and punches. Heppenstall Co.

Presto
A C-Cr type tool steel. Contains C 1.05, Cr 1.40. Carpenter Steel Co.

Prior
A high speed steel. Contains C 0.78 to 0.84, Mn 0.25 to 0.35, Si 0.20 to 0.50, Cr 4.00 to 4.50, W 18.00 to 19.00, Mo .50 to 0.80, C 2.00 to 2.25. Kloster Steel Corp.

PRK-33 D5
Darwin & Milner, Inc.

Progen
A very hard and tough steel which hardens in water with no tempering. For shock tools, chisels, pneumatic tools, punches, shear blades, and blacksmiths' tools. Seaboard Steel Co. of America, Inc.

Pure-Ore
See Hi-Run, Kapo, Super Alloy, Air-Chrom, Chiz-Alloy, D-D-33, D-C-66, No. 14, Cobalt, Clipper, Prior, Special, Extra, Standard, K-L-S-44, V-76. Kloster Steel Corp.

Purple Label T5
Purple Label Extra T5
Wm. Jessop Steel Co.

Pyr-Oh-Die
An oil hardening, non-deforming die steel spherodized annealed to 20 RC. Will develop great hardness, density of structure plus strength and toughness. Pyramid Steel Co.

Pyro
A tough, water-hardening or oil-hardening steel, for hot header dies and chisels. Contains C 0.45, Mn 0.70, Si 0.25, Cr 1.00, V 0.20. Hawkridge Bros. Co.

Pyroneal
An 0.55 C, Mn-Cr-Mo-Ni hot work, annealed steel for user's hardening up to Bhn 555 for dies and punches. Heppenstall Co.

Turn to Page 370

BUSINESS ROUNDUP

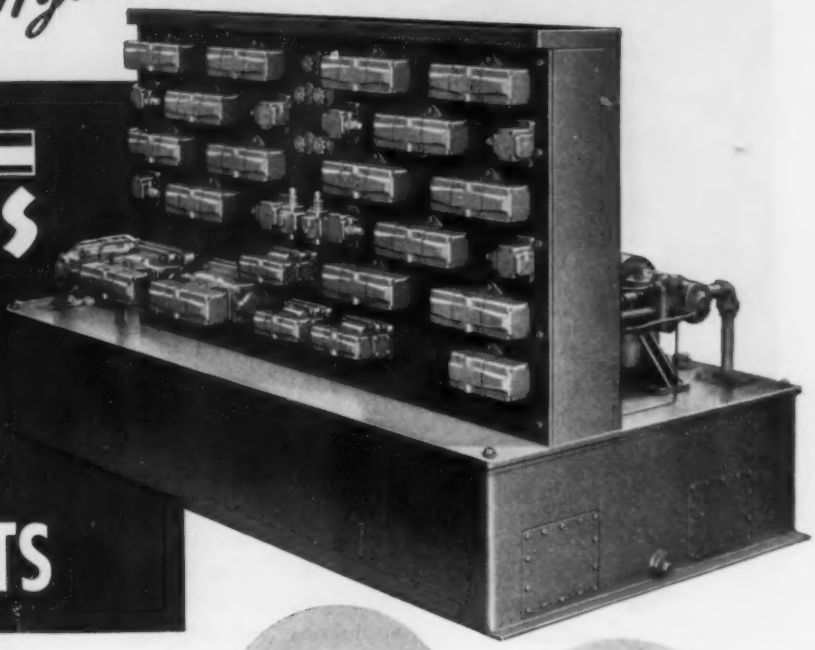
For a wealth of information on the metalworking industry and a keen appraisal of trends and developments turn to the Business Roundup, page 273.

In concise style, evaluated for the busy executive, and cross indexed for quick review, are the outstanding developments in every major field of metalworking during 1952. Trends and developments to watch for in 1953 are described and appraised. You'll want to keep this valuable material on business trends at hand.

You Wouldn't Buy a Washing Machine *This Way*

Then Why Buy Hydraulics Piecemeal?

VICKERS *Custom-Built* HYDRAULIC POWER UNITS



You would never go to the trouble of buying automatic washing machine parts and assembling them yourself. It would take a lot of time and patience and trouble. For one thing the maker could not risk guaranteeing the finished job. You buy a washing machine as a unit, and want the undivided responsibility of the manufacturer.

Then why buy hydraulics piecemeal when there are so many advantages in a Vickers Custom Built Power Unit? It is built to meet your individual requirements, in a compact, neat, self-contained "package." It includes all necessary pumps, valves, intermediate piping, oil reservoir, motors, controls etc. as well as all hydraulic accessories (oil filters, air cleaners, oil level gauges, fittings etc.). Hydraulic connections are grouped in a convenient manifold.

Hydraulic design is simplified and improved, and you save substantially on installation and maintenance cost. Vickers takes undivided responsibility for the entire hydraulic system and you get the benefit of Vickers skill and experience. These advantages are important to both the machine builder and his customer.

Ask the nearest Vickers factory-trained application engineer to send you new Bulletin 52-45 or to make a personal call.

Improve and Simplify Hydraulic Design

Reduce Installation and Maintenance Costs

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1420 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices:

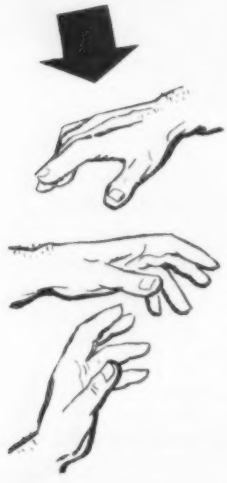
ATLANTA • CHICAGO (Metropolitan) • CINCINNATI • CLEVELAND
DETROIT • HOUSTON • LOS ANGELES (Metropolitan) • NEW YORK
(Metropolitan) • PHILADELPHIA (Metropolitan) • PITTSBURGH
ROCHESTER • ROCKFORD • SEATTLE • TULSA
WASHINGTON • WORCESTER

6071

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Minimize Manual Movement

Logan-built shearing lines are standard equipment in the nation's leading sheet mills. In this installation, both coils and sheets may be handled. These Logan Live Roll Conveyor units convey sheets automatically through side trimming, roller leveling, and end shearing operations to Piler and Runout Conveyor.



How many times do you "pick it up — and lay it down." That is what costs money as your product moves through processing, warehousing and shipping.

Reduce the number of times the product is touched by human hands and you cut your costs . . . permanently.

Let Logan equipment do your moving. Frequently work can be performed enroute, without removal from the conveyor, and always there is a reduction in expensive manual handling.

And "don't forget the extras you get" in Logan engineering and design. Write today for literature.

Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.

—Tool Steels—

Continued

Pyrotem
An 0.55 C, Mn-Cr-Mo-Ni hot work, prehardened steel, Bhn 341 to 429 for dies and punches. Heppenstall Co.

Python W2 (0.90 to 1.00 C)
Allegheny Ludlum Steel Corp.

Q

Quaker
A low carbon air hardening specialty steel. Contains C 0.40, Mn 0.40, Cr 4.50, Mo 1.00, W 0.80. Gulf Steel Corp.

R

R. D. S. L6
The Carpenter Steel Co.

RT
Fast-finishing steel for draw dies, punches and burnishing tools. Contains C 1.30, W 3.75. Firth Sterling, Inc.

Record 66 M2
Boyd-Wagner Co.

Record A
Hot work steel, for hot piercing and for gripper dies. Contains C 0.50, Mn 0.25, Si 0.20 to 0.40, Cr 3.75, V 0.75, W 14.00. McInnes Steel Co.

Record Superior T1
Boyd-Wagner Co.

Red Chip T4
Firth Sterling, Inc.

Red Cut Cobalt T4
Red Cut Cobalt B T5
Red Cut Superior T1
Vanadium-Alloys Steel Co.

Red Indian
A hot work steel containing Cr 5.00, W 4.00 with V, Mo and Co. Atlas Steels, Ltd.

Red Label W1 (1.00 C)
A Milne & Co.

Red Label W1-W3 (Gr 1)
Simonds Saw and Steel Co.

Red Star Tool W1
Vanadium-Alloys Steel Co.

Red Star Tungsten
A high carbon, low tungsten, oil hardening die steel. Vanadium-Alloys Steel Co.

Red Star Vanadium W2
Vanadium-Alloys Steel Co.

Red Streak T1
Simonds Saw and Steel Co.

Refined 8 W1 (0.80 C)
Atlas Steels, Ltd.

Reliance W1 (1.00 C)
Pittsburgh Tool Steel Wire Co.

Rema
A dead-soft very low-carbon steel which hobs easily. Suitable for making deep cavity molds for plastics industry. Contains C 0.05, Mn 0.20, Si 0.10. Hoyland Steel Co., Inc.

Remalloy
An intermediate mold steel for the plastics industry. Can be easily hobbed and possesses good core strength. Contains C 0.10, Mn 0.50, Si 0.40, Cr 0.65, Ni 1.50. Hoyland Steel Co., Inc.

Renown
C-V water hardening tool steel, for dies, reamers, taps, punching and trimming dies, gages, etc. Contains C in various tempers, Mn 0.25, Si 0.20, Cr 0.05, V 0.20. Latrobe Steel Co.

Renown W2
Latrobe Steel Co.

Republic Cobalt High Speed T4
Republic Steel Corp.

Resco
A tungsten-nickel type of hot work steel for severe hot operations. Contains C 0.25 to 0.30, Mn 0.30 to 0.40, W 9.50 to 10.50, Cr 2.50 to 3.00, Mo 0.20 to 0.30, Ni 1.50 to 1.75. Republic Steel Corp.

Rex 95 T8
Rex 440 T6
Crucible Steel Co. of America.

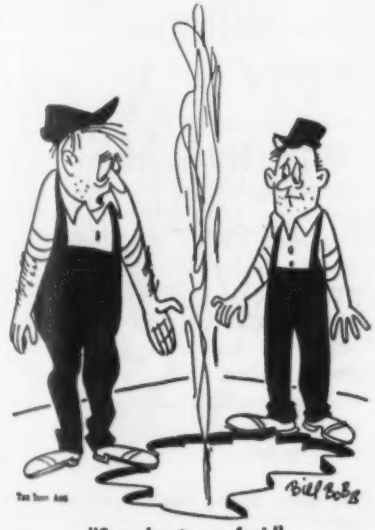
Rex 939
A special W-V high speed steel designed for applications where high abrasive resistance and ability to hold a fine cutting edge is wanted. Contains C 1.05, Cr 4.00, W 18.00, V 3.25, Mo 0.80. Crucible Steel Co. of America.

Rex 939 T3
Rex AA T1
Rex AAA T4
Crucible Steel Co. of America.

Rex M-3
A W-Mo-V high speed steel for applications where superior cutting quality and high abrasive resistance is wanted. Contains C 1.05, Cr 4.00, W 6.00, Mo 0.50, V 2.65. Crucible Steel Co. of America.

Rex M2-5 M36
Rex M3 M3
Rex Supercut T5
Rex Supervan T2
Rex TMO M1
Crucible Steel Co. of America.

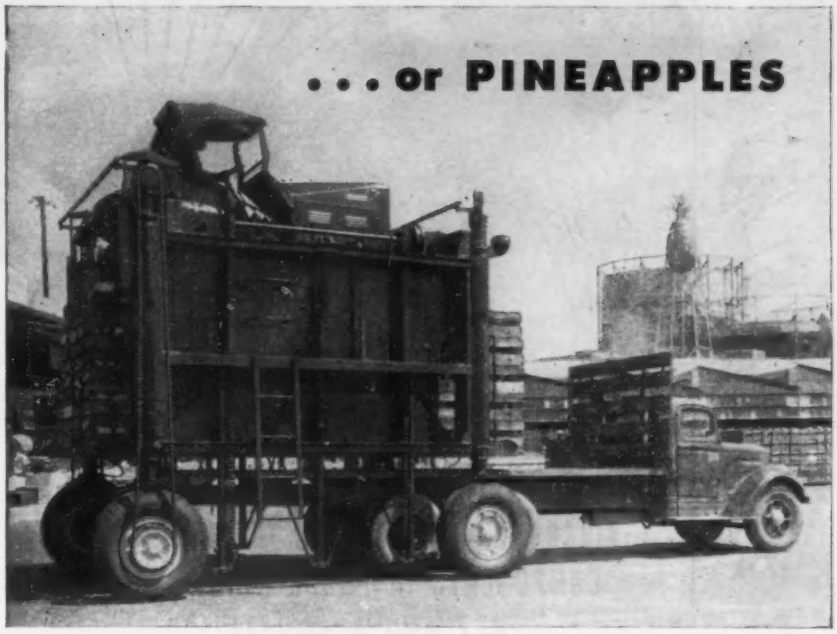
Turn Page



"Sure heats up fast."

Maybe your business isn't LUMBER...

...or PINEAPPLES



BUT... just imagine the savings you could make, the problems you could solve by handling your materials with ROSS Straddle Carriers, the most flexible and most adaptable mass material handling method known!

ROSS engineers will be glad to work with your materials handling men in exploring the possibilities of ROSS Straddle Carriers for your operations . . . there's no obligation.

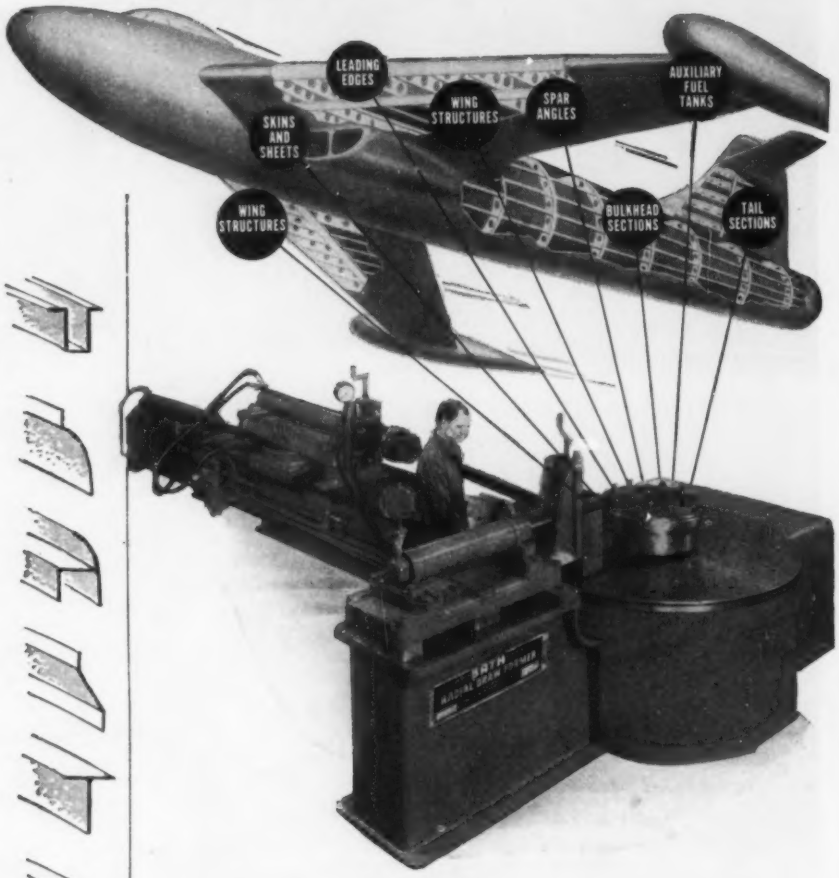
Send for details on ROSS Straddle Carriers . . . 10,000 lb., 20,000 lb., 35,000 and 45,000 lb. capacities.

Rely On ROSS

THE ROSS CARRIER COMPANY
Direct Factory Branches and Distributors throughout the world.
425 Miller St., Benton Harbor, Michigan, USA

LEADING AIRCRAFT MANUFACTURERS ARE BUYING

BATH RADIAL DRAW CONTOUR FORMERS



AIRCRAFT FUSELAGE AND JET ENGINE COMPONENTS IN PRODUCTION QUANTITIES ... *FAST AND ACCURATE!*

The versatility of the Bath Radial Draw Contour Former makes it a natural for forming aircraft fuselage, jet engine and guided missile parts. Stretch and compression formed, the parts pass rigid inspection. Cross sections of roll-formed and extruded parts as shown at left, are faithfully maintained throughout varied bends.

The performance range extends from shallow bends in formed strip stock and sharp bends in flanged extrusions to full circles and spirals in metals from 24ST aluminum to titanium of 95% purity.

Machine capacities from 12½ to 200 tons in standard Models. Write for catalog CF-352.

THE CYRIL BATH COMPANY

Manufacturers of Metal Forming Machinery

6940 MACHINERY AVENUE • CLEVELAND 3, OHIO

—Tool Steels—

Continued

Rocket
An air or oil hardening tool and die steel for high resistance to abrasion and wear. Lehigh Steel Corp.

RTS S2
Wm. Jessop Steel Co.

Ry-Alloy O2
Ry-Die A2
Joseph T. Ryerson & Son, Inc.

S

SC Special
A tungsten base hot work tool steel. Contains C 0.45, Cr 3.00, W 15.00. Vanadium-Alloys Steel Co.

S M
A shock resisting chisel and punch steel. Carpenter Steel Co.

S. O. D. O2
Braeburn Alloy Steel Div.

S. T. M. M1
Simonds Saw and Steel Co.

Sagamore A2
Allegheny Ludlum Steel Corp.

Samson Extra
Case-hardening alloy steel for plastic molds. Exceptional hobbing qualities, with high core strength. Good machinability. Contains C 0.10, Cr 2.25. Carpenter Steel Co.

Sanderson Extra W1 (Gr 2)
Sanderson Special W1 (Gr 1)
Crucible Steel Co. of America.

Saratoga O1
Allegheny Ludlum Steel Corp.

Secobalt
A super high speed steel for roughing and deep interrupted cuts. High Co content. Contains C 0.75, Mn 0.30, Cr 5.00, Co 11.00, V 1.50, W 18.00, Mo 0.80. Seaboard Steel Co. of America, Inc.

Secodle
An air-hardening, non-deforming cold die steel, containing C 1.35, Mn 0.60, Si 1.20, Cr 6.00, V 0.35, Mo 1.50. Seaboard Steel Co.

Turn to Page 376

"By golly, Spring has slipped up on us again."

Tool Steels

Continued

Secoloy
Turning alloy for rough machining at very high speeds. Sold only in tool bit form; cannot be forged. Contains Fe 2.00, C 2.50, Cr 33.00, Co 44.00, W 17.00. Seaboard Steel Co. of America, Inc.

Secovan
A high speed steel for roughing and finishing. High V content. Contains C 0.70, Mn 0.25, Cr 4.50, V 2.25, W 18.00, Mo 0.65. Seaboard Steel Co. of America, Inc.

Select B A2
Latrobe Steel Co.

Select M
An oil or air hardening die steel; for hot gripper dies, hot forming dies, etc. Contains C 0.90, Cr 3.50, V 0.25, Mo 0.60. Latrobe Steel Co.

Seminole S1

Seminole Hard S1

Seminole Medium S1
Allegheny Ludlum Steel Corp.

Seneca H21
Atlas Steels, Ltd.

Shearcut S-5
Gulf Steel Corp.

Shearcut S5
Pennsylvania Steel Corp.

Sheffield 10
Gear and shaft steel which requires no heat-treatment and can be machined with ordinary high-speed tools. North American Steel Co.

Sheffield 20
Turned, ground and polished. Heat treated, stress relieved and machine straightened. North American Steel Co.

Sheffield P.B.
Press brake die steel. Heat treated and stress relieved. High tensile qualities. Free machining. North American Steel Co.

Silman
A Si-Mn shock resisting punch and chisel steel. Vanadium-Alloys Steel Co.

Silvaloy
Turned, ground, polished, heat treated, stress relieved and machine straightened. For shafting or machined parts. Pyramid Steel Co.

Silver Star W2 (Gr. 4, 0.90 to 1.00 C)
Firth Sterling, Inc.

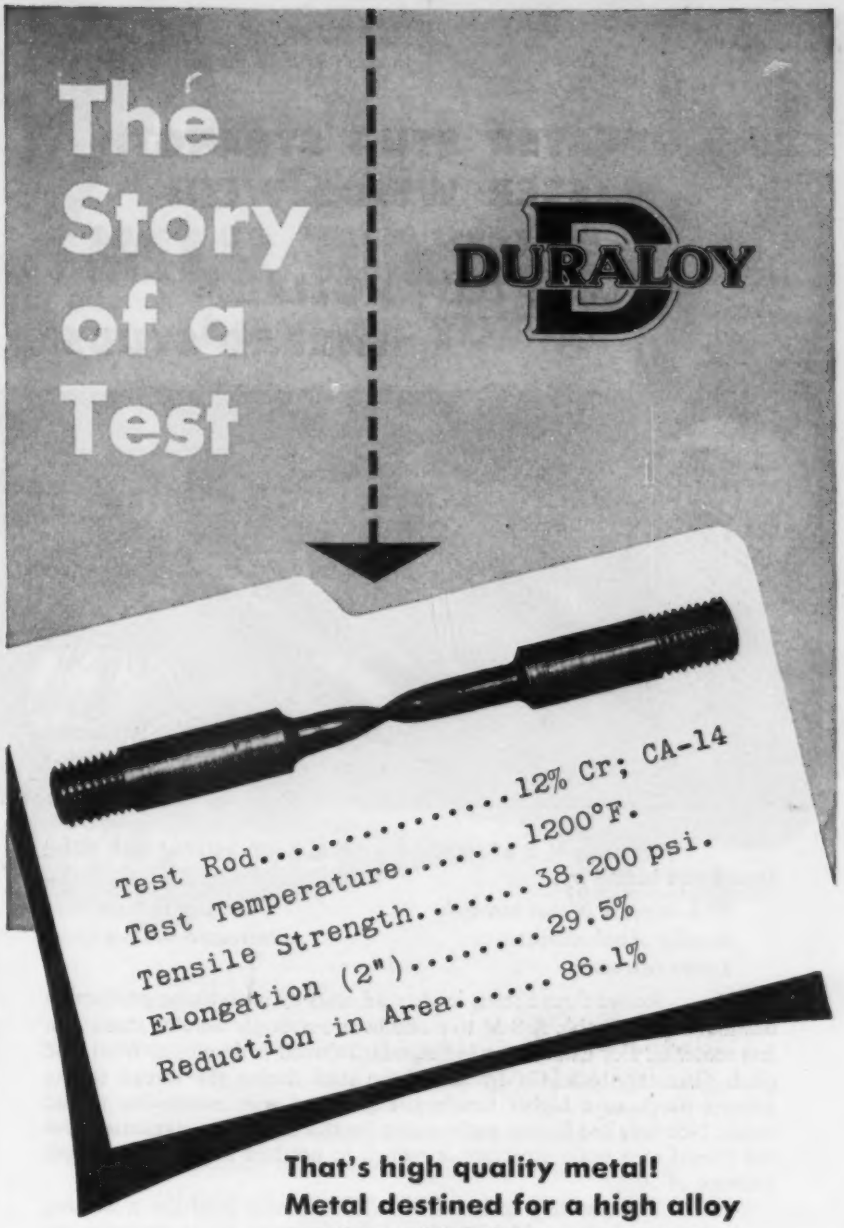
Silver Die 1
W1 (Gr. 1, 0.80 to 1.20 C)

Silver Die 2
W1 (Gr. 1, 0.80 to 1.20 C)
Firth Sterling, Inc.

METAL INDUSTRY FACTS

For overall usefulness in making vital decisions affecting your industry in 1953 you can't beat the Metal Industry Facts section presented on page 393.

First presented 3 years ago and now regarded by many readers as an indispensable reference—this special section is packed with salient statistics on price, production and market data.



That's high quality metal! Metal destined for a high alloy casting which has to meet some pretty rigid specifications!

The story we want to tell here is about our Testing Facilities. We have right in our foundry every conceivable testing facility needed when checking static or centrifugal high alloy castings for industry. Where required, we make complete chemical, metallurgical, and mechanical checks and tests. And have both a 400,000 volt X-ray unit and gamma-ray unit, for checking the final casting for hidden flaws.

As we see it, the only way to assure customers of high quality castings is to have and use all necessary facilities for testing and checking the heat, pour and finished casting.

THE DURALOY COMPANY

Office and Plant: Scottdale, Pa. • Eastern Office: 12 East 41st Street, New York 17, N.Y.

Detroit Office: THE DURALOY COMPANY, 805 New Center Building

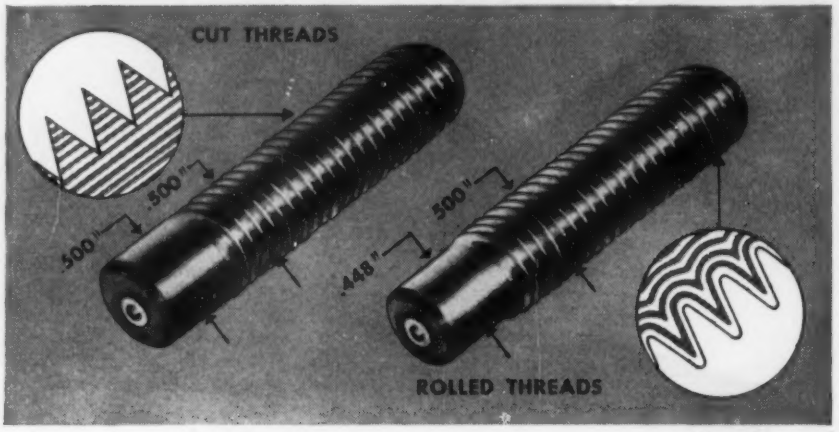
Atlanta: J. M. TULL Metal & Supply Co. Chicago: F. O. NELSON 332 S. Michigan Avenue San Francisco: JOHN D. FENSTERMACHER 1241 Taylor Street

METAL GOODS CORP. Dallas • Denver • Houston • Kansas City • New Orleans • St. Louis • Tulsa

improved stud welding
through **K S M** engineering

20% GREATER STUD STRENGTH . . . FASTER WELDS WITH

K S M ROLLED THREAD STUDS



By using K S M standard welding studs designed with rolled thread you benefit by:

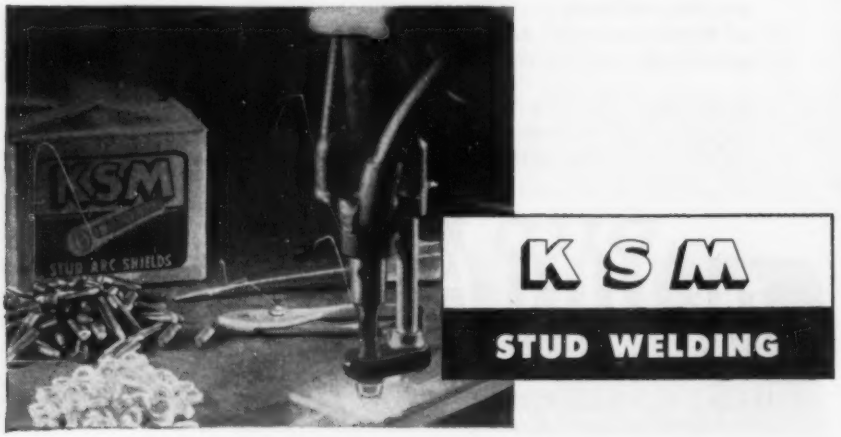
20% increase in stud strength — *Greater stud ductility*
Smaller shank diameter — *Increased welding speed*
Lower cost studs

Rolled thread studs lower stud costs by introducing production techniques that enable K S M to manufacture stronger welding studs with less material. For example, a ½" standard thread is developed from .448 pitch diameter stock. Cold-working the steel during the thread rolling process produces a higher tensile strength stud with mirror-like thread finish. Not only are fatigue paths set up by thread cutting eliminated, but the thread area grain structure is refined to produce an overall strength increase of 20%.

The resulting design of K S M standards produces a welding stud which has better weldability due to the decreased shank diameter, yet does not sacrifice strength at the weld area nor in the shank itself.

Rolled threads are one of many improvements K S M engineering is providing users of electric-arc stud welding . . . improvements that make tough fastening jobs easy and fastening costs lower.

Get K S M benefits for your stud welding. K S M Products, Inc., Merchantville, N. J. Phone Merchantville 8-4160.



—Tool Steels—

Continued

Silver Hardtem
A prehardened steel for hot work dies. Contains C 0.35, Mn 0.30, Cr 5.00, Mo 2.00, Si 1.00, Ag 0.20. Heppenstall So.

Silver Label
A shock resisting steel used wherever tools must take repeated heavy impacts at normal temperatures. Contains C 0.60, Mn 0.70, Si 1.85, Mo 0.50, V 0.25. Peninsular Steel Co.

Silver Star W1 (Gr. 4, 0.80 to 1.20 C)
Firth Sterling, Inc.

Sixix M2
Atlas Steels, Ltd.

Solar S2
The Carpenter Steel Co.

Sparta A2
Universal-Cyclops Steel Corp.

Spartan 5
A hot work 18-4-1 steel containing 0.50 C. Atlas Steels, Ltd.

Spartan 7 T1
Atlas Steels, Ltd.

Special W1
Braeburn Alloy Steel Div.

Special
Special grade carbon tool steel for blanking, drawing and forming dies. Water hardening. Kloster Steel Corp.

Special W1
Faitoute Iron & Steel Co., Inc.

Special W1
Latrobe Steel Co.

Special W1
Universal-Cyclops Steel Corp.

Special W1 (0.80 to 1.20 C)
Republic Steel Corp.

Special W1 (1.00 C)
Columbia Tool Steel Co.

Special W1 (Gr. 1, 0.80 to 1.20 C)
Firth Sterling, Inc.

Special 18s S5
Boyd-Wagner Co.

Special A. S. V. W1 (Gr. 1, 0.80 to 1.20 C)
Firth Sterling, Inc.

"Miss Jones just resigned to get married."

Special BB H21
Wm. Jessop & Sons Ltd.

Special Carbon
Water hardening, medium grade carbon tool steel, for drills, etc. Contains C as specified, Mn 0.25, Si 0.25.
Latrobe Steel Co.

Special Chrome Nickel
Alloy heat resisting steel for hot work, combining toughness with non-deforming qualities, also for cold work; for blanking and forming dies, rivet dies, shear blades, punches, piercing dies, collets. Contains C 0.70, Mn 0.65, Cr 0.55, P 0.025, Ni 1.50.
McInnes Steel Co.

Special Draco W2
Special Draco DV W3
Universal-Cyclops Steel Corp.

Special HS T1
Bethlehem Steel Co., Inc.

Special K5 A2
Special KN D2
Special KR D3
Raven Steel & Tool Co.

Special M-O High Speed M2
Special Oil Hardening O1
Republic Steel Corp.

Special Oil Hardening O2
Wm. Jessop & Sons Ltd.

Special Oilway O2
H. Boker & Co., Inc.

Special Punch S5
Republic Steel Corp.

Special V W2
Braeburn Alloy Steel Div.

Special V W2 (Gr. 1, 0.90 to 1.00 C)
Special XX W1 (Gr. 1, 0.80 to 1.20 C)
Firth Sterling, Inc.

Speed-Cut
Free machining die steel for plastic molds and white metal casting dies. Can be treated prior to machining.
Vanadium-Alloys Steel Co.

Speed Star M2
Carpenter Steel Co.

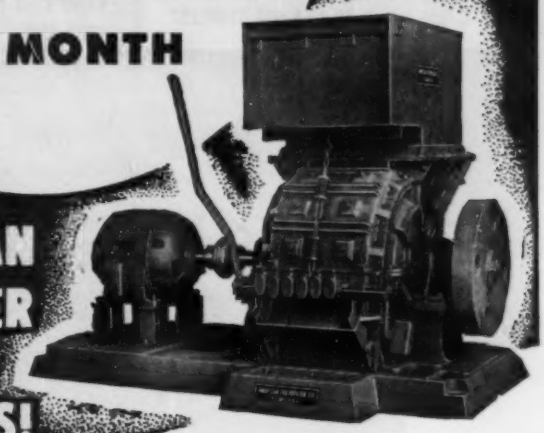
Speedcut "Cushnd" Tool Bits
A high cobalt high speed ground tool bit with silver brazed copper shim to absorb shock.
Lehigh Steel Corp.

Turn Page

"Do you know how miserable you're making it for my employees, starting my day off like this?"

IF YOUR METAL TURNINGS AMOUNT TO 10 TONS OR MORE PER MONTH

AN AMERICAN METAL TURNINGS CRUSHER can bring you NEW PROFITS!



AMERICAN #2400 METAL TURNINGS CRUSHER

A chip salvage system, with an American Metal Turnings Crusher at the core, can help you realize new savings and profits in metal, oil, man-hours, factory space, and tool maintenance. Consider these typical money-saving, money-making advantages of an American installation:

(1) **Brings $3 to $4 more per ton for chips** than for long machine shop turnings,
(2) **Reclaims 30 to 50 gallons of cutting oil per ton,**
(3) **Prolongs tool life** through more liberal use of recovered oil,
(4) **Saves 75% storage space . . .** permits heavier freight car loads . . . cuts shipping costs,
(5) **Easier, faster handling,**
(6) **Easier briquetting,** so essential for foundry and steel mill use.

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings Per Year ..... $ 960.00 Per Year
(20 tons per month at $4 extra per ton)

3600 Gallons Cutting Oil Recovery at 30¢ Per Gallon.. $1,080.00 Per Year
(30 gallons per ton x 240 tons = 7200 gallons.
Half of this, 3600 gallons, can be credited to use of chips instead of long turnings.)

Estimated Savings on Manpower, Storage, Tool Maintenance, Freight, etc. ..... $ 300.00 Per Year

TOTAL GROSS PROFIT
(Resulting from an American Installation)..... $2,340.00 Per Year

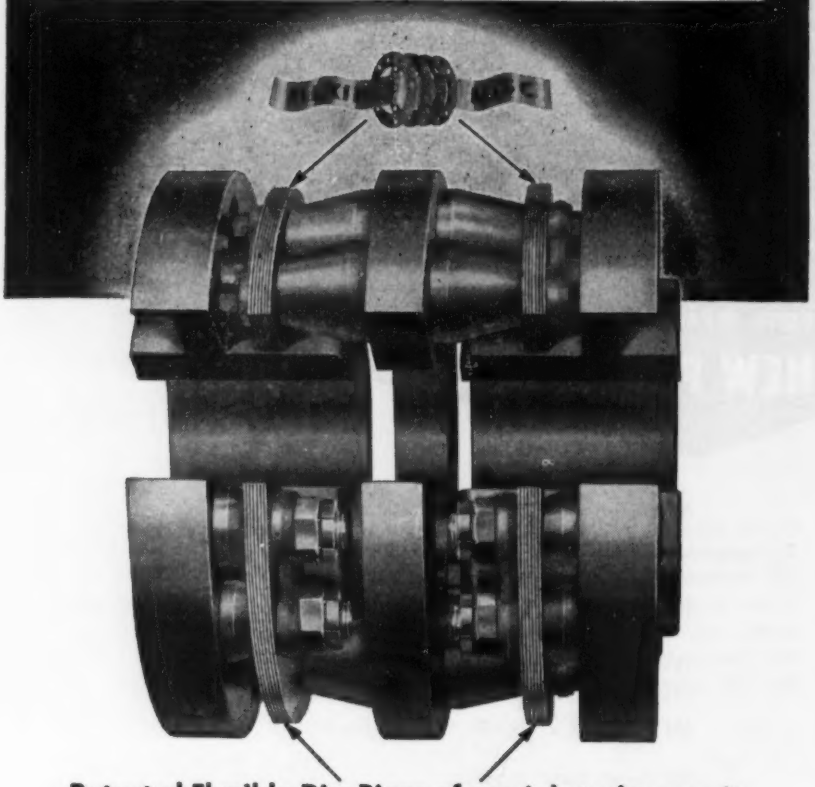
WRITE for American Rolling Ring Metal Turnings Crusher Bulletin.

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers
1439 MACKLIND AVE.
ST. LOUIS 10, MO.

AVOID COSTLY SHUT-DOWNS!

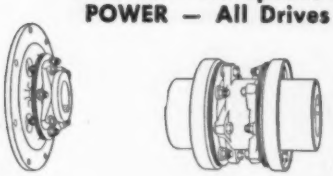
prolong the life of your machines with Thomas Couplings

DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS	
GREATEST ECONOMY	No Maintenance Pays for Itself
NO LUBRICATION	No Wearing Parts Human Element Eliminated
NO BACKLASH	All Parts Solidly Bolted No Loose Parts
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

SPEEDS — All Speeds up to 30,000 RPM.
POWER — All Drives up to 40,000 HP.



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

MANUFACTURERS OF FLEXIBLE COUPLINGS ONLY FOR OVER 35 YEARS

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.

—Tool Steels—

Continued

Sphynx Oil Hardening 02
Bowsteel Distributors Corp.

SS Tool L7
Crucible Steel Co. of America.

SSC W1 (1.00 C)
Darwin & Milner, Inc.

Staminal
Oil or air hardening steel, for chisels, cold cutters, die blocks, die sinking hobs, punches, rim rolls, shear blades. Has extreme toughness. Contains C 0.55, Mn 0.90, Si 1.00, Cr 0.40, Ni 2.70, V 0.12, Mo 0.45. Latrobe Steel Co.

Standard
Water hardening tool steel in a standard grade for ordinary purposes. Kloster Steel Corp.

Standard W1
Latrobe Steel Co.

Standard W1
Universal-Cyclops Steel Corp.

Standard W1 (0.80 to 1.00 C)
Republic Steel Corp.

Standard W1 (0.90 C)
Boyd-Wagner Co.

Standard W1 (1.00 C)
Columbia Tool Steel Co.

Standard Draco W2
Standard Draco DV W3
Universal-Cyclops Steel Corp.

Standard Tool Steel W1 (Gr. 3)
Hawkridge Brothers Co.

Standard Vanadium W2 (0.90 C)
Columbia Tool Steel Co.

Star Blue Chip
Low tungsten high-speed steel containing W 14.00, Cr 4.00, V 1.70, Firth Sterling, Inc.

Star Columbium
A high speed steel with extra wear and abrasion resistance. Contains C 0.80, Cr 4.25, Mo 4.50, W 5.50, V 1.50, Cb 1.25. The Carpenter Steel Co.

Star Max M1
Carpenter Steel Co.

Star-Mo-M-2 M2
Firth Sterling, Inc.

"Whatever you want to give will be O.K."

Star-Mo Mod.
Medium charbon molybdenum high speed steel processing high toughness and abrasion resistance. Contains C 0.65, Cr 4.25, Mo 6.00, W 6.00, V 2.00. Firth Sterling, Inc.

Star-Zenith T1
The Carpenter Steel Co.

Star-Zenith Low Carbon
An 18-4-1 high speed tool steel with low carbon content to increase toughness at elevated working temperatures. The Carpenter Steel Co.

Stentor O2
The Carpenter Steel Co.

Sterling W1 (Gr. 3, 0.80 to 1.20 C)
Firth Sterling, Inc.

Sterling M
A water hardening carbon-chromium steel. Contains C 1.20. Firth Sterling, Inc.

Sterling V W2 (Gr. 3, 0.90 to 1.00 C)
Sterling XX
W1 (Gr. 3, 0.80 to 1.20 C)
Firth Sterling, Inc.

Su-Pyr-Loy
A non-tempering steel with extreme toughness, high hardness and ease of working. Pyramid Steel Co.

Super Alloy
A chrome tungsten shock steel. Contains C 0.45 to 0.50, Mn 0.35, Si 0.90 to 1.00, Cr. 1.25, W 2.25 to 2.50, V 0.20 to 0.25. Kloster Steel Corp.

Super Cobalt T5
Simonds Saw and Steel Co.

Super DBL M36
Allegheny Ludlum Steel Corp.

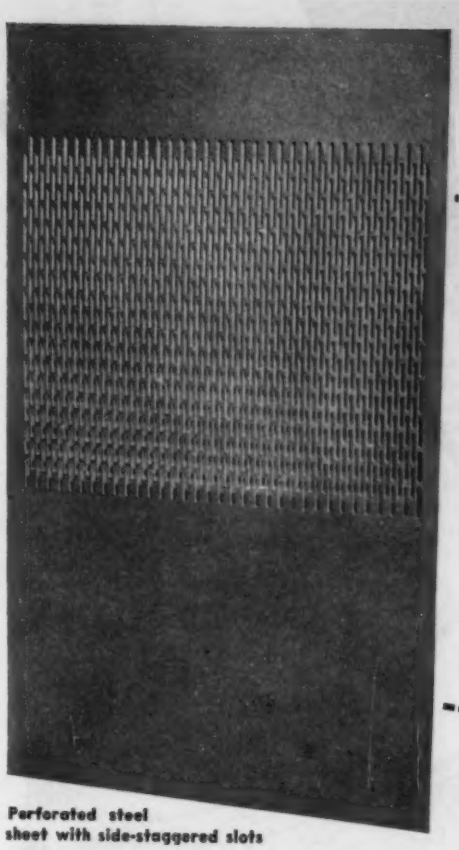
Super Dreadnought
A high speed steel. Designed for heavy cuts on hard materials. Contains C 0.75, W 14.00, Cr 4.00, V 2.00. Hawkridge Brothers Co.

Super Kinite D5
H. Boker & Co., Inc.

Super Mo-Chip
Super high speed steel, for difficult machining operations, containing carbon as required, Cr 4.00, Co 8.00, V 1.50, Mo 8.00. Firth Sterling, Inc.

Turn Page

"So I took the million dollars, bought a factory, and got a government contract for aircraft engines."



Perforated steel sheet with side-staggered slots

Wesix Electric Heater

HENDRICK PERFORATED METAL

has wide range of uses in Modern Designing

Here is a typical example of how Hendrick Perforated Metal is used by a stove manufacturer to secure strong and rigid construction with light weight; protection of the heating coil, without interfering with radiation of heat; economical production; and attractive appearance.

Hendrick supplies perforated steel sheets as illustrated, and the Wesix Electric Heater Company uses them in fabricating its lightweight electric heaters.

For scores of other purposes Hendrick Perforated Metal is being utilized with equally satisfactory results.

Hendrick engineers will be glad to give you the benefit of their broad experience by recommending the most suitable kind and gauge of metal, and shape and size of perforations, to meet the requirements for any particular product for which you would like the advantages of perforated metal.

Write for complete information.

SEE OUR CATALOG IN SWEET'S

HENDRICK
Manufacturing Company
37 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

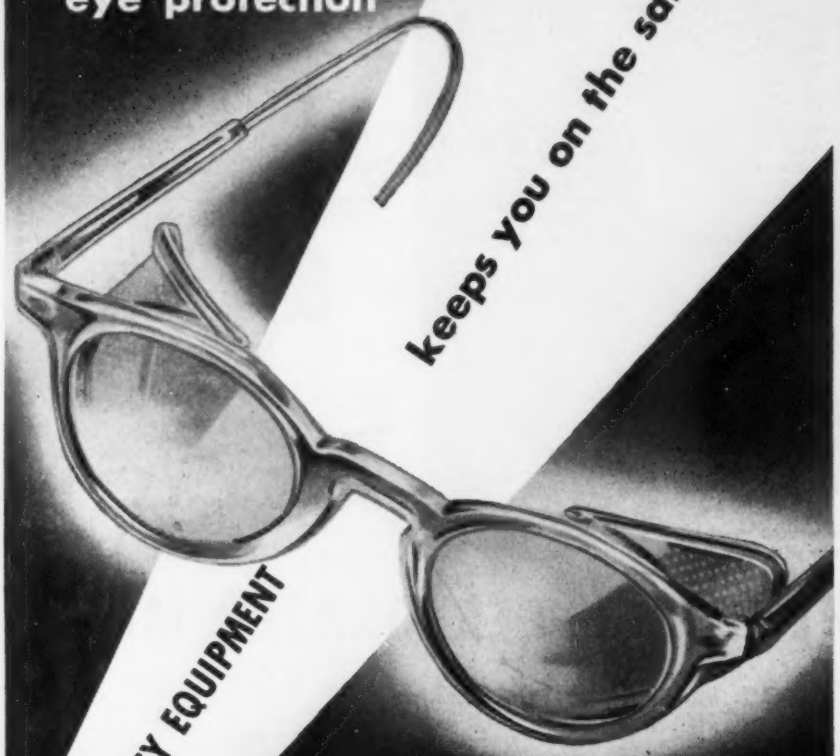
Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

WILLSON

dependable eye protection

keeps you on the safe side

WILLSON SAFETY EQUIPMENT



Combined protection, comfort and appearance make Willson safety spectacles outstanding in value. Choose from a full range of metal and plastic frames—fitted with Super-Tough* heat-treated glass lenses, or Plas-Tough* plastic lenses—every one tested for impact resistance and optical quality. Send for catalog describing our complete line of safety equipment.

STYLE AH

METAL FRAME Latest style spectacle with single bridge. Have Hi-Line temples with a "dressy" look. Also available with side shields. (Non-flammable plastic frame Style WKS shown at top.)

CHOOSE YOUR FAVORITE LENSES FOR ANY WILLSON SPECTACLES

SUPER-TOUGH*
WILLSONITE®
PLAS-TOUGH*

Three popular types of lenses are available for all Willson Spectacles. Clear glass Super-Tough*, Willsonite® Green Super-Tough* and the new Plas-Tough* lenses that combine the impact resistance of heat-treated glass with the comfort of lightweight plastic.

*Trademark

See your WILLSON distributor or write for Catalog

WILLSON PRODUCTS, INC. 231 Washington Street, Reading, Pennsylvania

—Tool Steels—

Continued

Super MoTung Special M36
Universal-Cyclops Steel Corp.

Super Panther T5
Allegheny Ludlum Steel Corp.

Super Rapid Extra T1
Super Rapid Extra 500 T4
Super Rapid Extra Mo M2
Raven Steel & Tool Co.

Super Samson

High strength air-hardening steel for hobbed die casting dies and plastic mold cavities. Can be used at higher than normal temperatures without softening appreciably. Contains C 0.80, Cr 5.00, Mo 0.90, V 0.25. The Carpenter Steel Co.

Super Star-Zenith T2
The Carpenter Steel Co.

Super Van Dreadnought T2
Hawkridge Brothers Co.

Superb

A high C-Cr-V tool steel, for dies, drlils, punches, shear knives, spindles, etc. Contains C 0.75, Mn 0.25, Si 0.25, Cr 0.95, V 0.18. Latrobe Steel Co.

Superdie D3
Columbia Tool Steel Co.

Superior 1 D3
Superior 2 D5
Superior 3 D2
Braeburn Alloy Steel Div.

Superla W2 (1.30 C)
Boyd-Wagner Co.

Supremus T1
Supremus Extra T2
Jessop Steel Co.

Swed-Oil

A non-deforming steel, containing C 0.95 to 1.00, Mn 1.10 to 1.20, Si 0.37, Cr 0.45 to 0.50, W 0.45 to 0.50, V 0.20. Kloster Steel Corp.

Turn Page

"We're all one big happy family here."

T-Alloy A H21
Braeburn Alloy Steel Div.

T-K H21
The Carpenter Steel Co.

T. T. Q TG
Wm. Jessop & Sons Ltd.

Talide
Brand name of a line of carbides. Metal Carbides Corp.
(See "Carbides" listing, Jan. 8, 1953, issue.)

Tantung
Cast-cobalt-chromium-tungsten alloys for metal cutting at speeds intermediate between those for H.S.S. and carbides; for applications requiring superior resistance to wear, to oxidation at elevated temperatures and to chemical corrosion. Vascoloy-Ramet Corp.

Teenax 46 O1
Simonds Saw and Steel Co.

Temp Air 8
Contains C 0.60, Cr 3.60, V 1.75, Mo 8.50. Gulf Steel Corp.

Temperdie
Special analysis hot work for hot header dies, punches, hot press die, etc. Contains C 0.40, Mn 1.00, Cr 1.50, V 0.25. Pennsylvania Steel Corp.

Tempo
Oil hardening, non-deforming steel for gages, hobs and master tools. Contains C 0.90, Mn 1.15, Cr 0.50, W 0.50. Pennsylvania Steel Corp.

Tennessee Special
See references to Drill Steel, Tool Steel, and Channeller Steel. Made by Tennessee Coal, Iron & Railroad Co.

Tensiloy Cobalt-Tungsten High Speed T-6

Tensiloy High Carbon-High Chrome D-2

Tensiloy High Speed T-2

Tensiloy Nitriding Die M-1
Allied Steel & Chemical Co.

Tensiloy Non-Tempering
A water hardening alloy tool steel containing C 0.33, Mn 0.40, Si 0.65, Cr 0.75, Cu 0.75, Mo 0.75. Allied Steel & Chemical Co.

Tensiloy Oil-Hardening Die O-1
Allied Steel & Chemical Co.

Teton L7
Allegheny Ludlum Steel Corp.

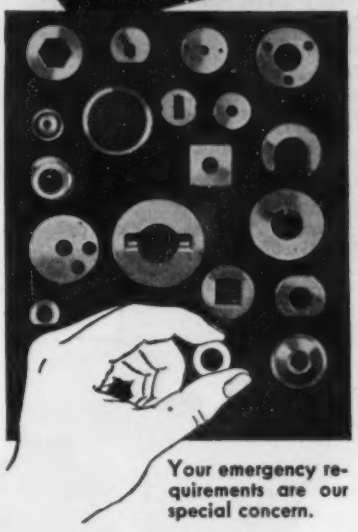
TRADE ASSOCIATIONS

You'll want to keep up to date on the 200-odd trade associations which serve the metalworking industry. For your convenience, this popular and useful listing is again presented on page 470.

In addition to the usual listing of association names, addresses and secretaries, the listing has been indexed by the field which the association serves. Keep it at hand for convenient reference.

Standard ..Specials

STEEL WASHERS FOR EVERY NEED



A DEPENDABLE SUPPLIER FOR 38 YEARS . . .

Your requirements for standard and special steel washers are sure to be satisfied at Joliet. A bank containing thousands of special dies in many shapes and forms, 9/32" to 8" O.D., gauges No. 28 to 3/8", stands ready to answer your needs. A VARIETY OF FINISHES IS AVAILABLE to meet your special needs, including: Electro-plating, Galvanizing, Parkerizing, and Cyanide hardening.

Your emergency requirements are our special concern.

After All!
THERE'S NO SUBSTITUTE FOR QUALITY AND SERVICE

201 CONNELL AVE.
JOLIET, ILLINOIS

JOLIET WROUGHT WASHER CO.

"Pete just won't talk with any one but a Columbia man since he hit a production high with SUPERDIE."

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels—High Speed Steels Die Steels—Hot Work and Shock Resisting Steels Carbon Tool Steels.

TOOL COLUMBIA STEELS

Tool Steels

Continued

Thermold A H11
Thermold AV H13
Thermold B H12
Universal-Cyclops Steel Corp.

Tiger Brand
Steel for high speed cutting tools. Contains C 0.75, Cr 4.00, V 1.00, W 0.18. Bissett Steel Co.

Tioga L6
Allegheny Ludlum Steel Corp.

Tool Grade W1 (0.80 to 1.00 C)
Republic Steel Corp.

Top Notch S1
Jessop Steel Co.

Torpedo O1
Lehigh Steel Corp.

Tough M
A chrome-vanadium special purpose steel. Bethlehem Steel Co., Inc.

Tri-Ack D2
Ackerlind Steel Co., Inc.

Trimo D2
Uddeholm Co. of America, Inc.

Triple Die D3
Firth Sterling Inc.

Triton S2
Braeburn Alloy Steel Div.

Trojan T2
Atlas Steels Ltd.

Trojan 8
A 0.75 to 0.85 carbon water-hardening steel; hardens, welds and forges readily; is strong and tough. Used for pick points, hand chisels, blacksmith, mine and quarry tools, pneumatic street tools, etc. Horace T. Potts Co.

Tru-Cor W1 (Gr. 3)
Kidd Drawn Steel Co.

Truform O1
Jessop Steel Co.

Tunco T4
Simonds Saw and Steel Co.

Tuncro S1
Atlantic Steel Corp.

Tungaloy
A 1.60 w tool steel. Also contains C 1.20, Cr 0.60 and Mo 0.30. Boyd-Wagner Co.

Tungsten Alloy
Brand of a line of carbides. Tungsten Alloy Mfg. Co., Inc.
(See "Carbides" listing Jan. 8, 1953 issue)

Twin Mo M2
Twin Mo-Co M36
Twin Mo Va-3 M3
H. Boker & Co., Inc.

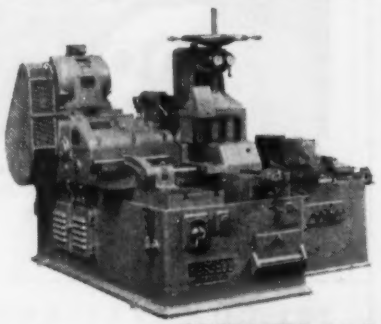
Twinvan T2
Braeburn Alloy Steel Div.

U

UA-8 L7
Republic Steel Corp.

UHB W1 (1.00 C)
Uddeholm Co. of America, Inc.

Turn to Page 385



RUSSELL
Cold Sawing MACHINES
- **FULLY AUTOMATIC HYDRAULIC** Capacities: 3½" to 9½" rounds
- **SEMI-AUTOMATIC** Capacities up to 13½" rounds

ASK FOR FREE GENERAL BULLETIN EG-3

TRIPLEX MACHINE TOOL CORP.
75 West Street — New York 6, N. Y.

Ingersoll specializes in . . .

ENGINEERING B-W PRODUCTION

STEEL DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue, Chicago 4, Illinois
Plant: New Castle, Indiana

Tool Steels

Continued

UHB-19 VA
A water hardening steel for cold header dies. Contains C 0.95, Mn 0.30, Si 0.25, V 0.10. Uddeholm Co. of America, Inc.

UHB-46	O1
UHB-151	A2
UHB-711	S1
UHB Extra	W1 (1.00 C)

Uddeholm Co. of America, Inc.

UHB Forma
A very soft cold hubbing steel for plastic molds. Contains C 0.05, Mn 0.10, Si 0.10. Uddeholm Co. of America, Inc.

UHB Ovar-2	H13

Uddeholm Co. of America, Inc.

UHB Premo
A cold hubbing oil or air hardening steel for plastic molds. Contains C 0.05, Mn 0.10, Si 0.10, Cr 4.00, Mo 0.50. Uddeholm Co. of America, Inc.

UHB Special Hot Work	H12
UHB-VA	W2 (1.00 C)

Uddeholm Co. of America, Inc.

Ultimo No. 6
A shock resistant steel, for cold or hot shearing applications. Contains Cr, Ni and Mo. Atlas Steels, Ltd.

Ultradie 1M	D3
Ultradie 3	D2

Universal-Cyclops Steel Corp.

Unico
Water hardening steel, for chisels, shear blades, punches, etc. Is extra tough. Contains Mn 0.30 to 0.40, Si 0.30 to 0.40, Cr 0.70, W 1.30. Hidalgo Steel Co.

Unicut	M3

Universal-Cyclops Steel Corp.

Unison
A non-tempering tool steel where shock resistance is required for general purpose applications ranging from arbors to well bits. Erie Steel Co.

US Ultra	H11

Raven Steel & Tool Co.

Turn Page

"Tool and die maker."

NEW T-J Spacemaker AIR CYLINDERS

CIRCULAR HEADS WITH TIE RODS
SQUARE HEADS WITH TIE RODS
SPACE SAVED
T-J SPACEMAKER . . . provides additional room for adjacent equipment without sacrificing strength.

- SAVES UP TO 40% SPACE WITH NEW STREAMLINED DESIGN.
- SUPER STRENGTH . . . EXTRA HIGH SAFETY FACTOR.
- SOLID STEEL HEADS.
- HEAVY WALL, PRECISION HONED, HARD CHROME PLATED SEAMLESS STEEL BODY.
- LEAKPROOF CYLINDER HEAD TO BODY CONSTRUCTION.
- RELATIVE PORT POSITIONS MAY BE ROTATED WITHOUT DISASSEMBLY OF CYLINDER AND LOCKED IN DESIRED POSITION.
- HEAVY DUTY, HI- TENSILE, HARD CHROME PLATED PISTON ROD.

Streamlined construction of the new T-J Cylinders *eliminates tie rods . . . reduces head size . . .* and *saves up to 40% in mounting space!* In addition, a new high in strength is achieved with solid steel heads and heavy wall seamless steel body . . . leakproof construction . . . extra high safety factor.

Cylinder walls are precision honed and hard chrome plated for long-life efficiency. Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . both cushioned and non-cushioned . . . for wide range of pushing, pulling, lifting, clamping or control jobs. T-J dependability. *Fast delivery* to meet rush requirements. Write for bulletin 8152. The Tomkins-Johnson Co., Jackson, Mich.

Many More Advanced Features!

37 YEARS EXPERIENCE

T-J TOMKINS-JOHNSON
RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

HAVE YOU HEARD ABOUT THIS NEW METAL CLEANER?
New metal cleaner removes oil and rust in one operation
IT CAN SAVE MONEY FOR YOU

Oakite Compound No. 33

REMOVES OIL
at the same time that it
REMOVES RUST...
And at the same time it prepares the metal for painting

Oakite Compound No. 33 is a great soak cleaner for steel, cast iron, aluminum sheet and castings. It removes oil, rust, heat scale, other oxides, carbon smut, soldering and welding residues, identification inks and other soils. *It frequently eliminates pickling operations on moderately rusty steel.*

Oakite Compound No. 33 is great for hand-swabbing on metal surfaces too large to be soaked in tanks. It can save money for you in many ways.

FREE For a copy of Folder F7993 *"New metal cleaner removes oil and rust in one operation"*, write to Oakite Products, Inc., 30H Rector St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

—Tool Steels—

Continued

Utex O1
The Diehl Steel Co.

Utica
A tungsten, chromium, vanadium, oil hardening steel, for blanking punches and dies, taps, drills, reamers, and broaches. Contains C 1.25, Cr 0.45, V 0.20 and W 1.40. Allegheny Ludlum Steel Corp.

Utility W1
Lehigh Steel Corp.

V

V-76
Mn-Si tool steel for shock applications. Oil or water hardening. Kloster Steel Corp.

V. D. C. H13
Latrobe Steel Co.

V.D. Chisel Steel
A water hardening C-Mo tool steel, especially suited for hand and pneumatic chisels. Joseph T. Ryerson & Son, Inc.

V. D. Tool Steel W2 (1.00 C)
Joseph T. Ryerson & Son, Inc.

V High Speed
General purpose high speed steel of uniform quality and toughness; for reamers, milling cutters, thread chasers, lathe, planer and boring tools and special wood-working cutters. Contains C 0.75, Si 0.20, Cr 4.00, V 1.10, W 18.25. McInnes Steel Co.

V-HW H13
Republic Steel Corp.

Van Chip M3
Firth Sterling Inc.

Van Cut M3
Vanadium Alloys Steel Co.

Van-Lom
A Mo-V high speed steel. Vanadium-Alloys Steel Co.

Vanadium BB
A special purpose low alloy tool steel. Contains C 1.00, Cr 1.50, V 0.20. Vanadium Alloys Steel Co.

"There isn't much anyone can tell Charlie about machine tools . . ."

cut power blade costs at least 15% with

VICTOR "Moly"® Blades

Yes, that's right—when you order VICTOR Moly Power Blades from your Distributor, you cut your initial blade cost 15%, and you'll get extra economies through faster, more efficient cutting and longer blade life.

Over the years, *quality* has made VICTOR Blades the blades industry prefers.

YOUR DISTRIBUTOR HAS VICTOR BLADES IN STOCK

For VICTOR Blades—as well as hundreds of other products you regularly buy—your Industrial Distributor is the man to call. He is close to your problems. He gives you fast service. He has the assistance of trained factory representatives in solving many of your every day production problems. Buy all you can from him.

VICTOR Hand and Power Hack Saw Blades Are Sold Only Through Recognized Distributors.

VICTOR
SAW WORKS, INC. • MIDDLETOWN, N. Y., U. S. A.
Makers of Hand and Power Hack Saw Blades, Frames and Metal Cutting Band Saw Blades
1824

Vanadium Crucible
A tough, water hardening steel, for cold forming dies and special tools. Contains C 0.80 to 1.00, Mn 0.30 to 0.40, Si 0.30, V 0.15 to 0.25. McInnes Steel Co.

Vanadium Types
Vanadium Types D, G, H, K, N, BB, C-V tool steels. Vanadium-Alloys Steel Co.

Vanite T2
Columbia Tool Steel Co.

Vasco M-2 M2
Vanadium Alloys Steel Co.

Vasco Supreme
Tungsten high speed steel with high hardness and wear resistance, good toughness and edge strength; for extra duty cutting. Contains C 1.50, V 5.00. Vanadium-Alloys Steel Co.

Vasco Supreme A
A tungsten-molybdenum high speed steel with high hardness and wear resistance, good toughness and edge strength; for extra duty cutting. Contains C 1.50, V 5.00. Vanadium Alloys Steel Co.

Vascoloy-Ramet
Brand name of a line of carbides. Vascoloy-Ramet Corp.
(See "Carbides" listing Jan. 8, 1953, issue.)

Vega
Air-hardening, non-deforming die steel. For blanking, piercing, trimming and forming dies. Contains C 0.70, Mn 2.00, Si 0.30, Cr 1.00 and Mo 1.35. The Carpenter Steel Co.

Venango
Chisel steel, for punches, chisels, rivet sets, etc. Very tough and resistant to fatigue. Contains C 0.50, Mn 0.45, Si 1.10, V 0.20, Mo 0.50. Universal-Cyclops Steel Corp.

Veribest
Drill rod. Contains C 1.20, Si 0.30, Mn 0.30, V 0.20, W 2.00. Diehl Steel Co.

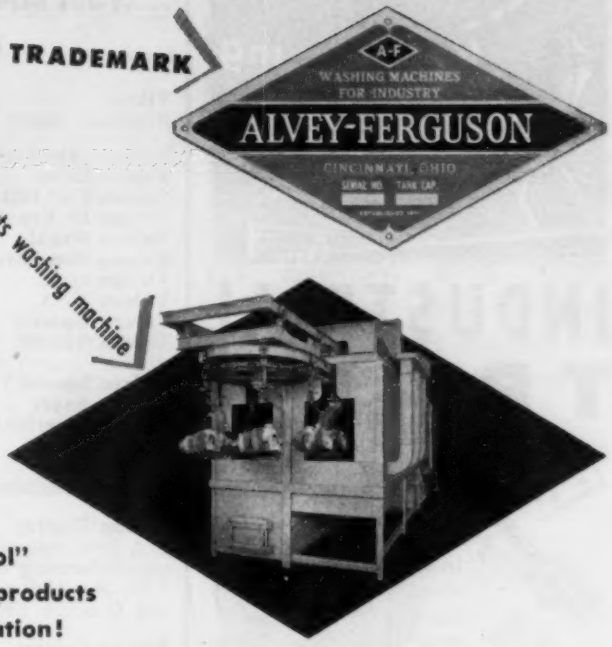
Very Best W2 (1.00 C)
Boyd-Wagner Co.

Vi-Chrome D3
Ackerlind Steel Co., Inc.

Turn Page

"Frankly, I was sold three hours ago, but you give such a wonderful pitch . . ."

THIS A-F TRADEMARK
on your metal products washing machine
Means
"quality control"
in your metal products
washing operation!



ALVEY-FERGUSON

THE ALVEY-FERGUSON COMPANY
563 DISNEY ST. SINCE 1901 CINCINNATI 9, OHIO
OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES

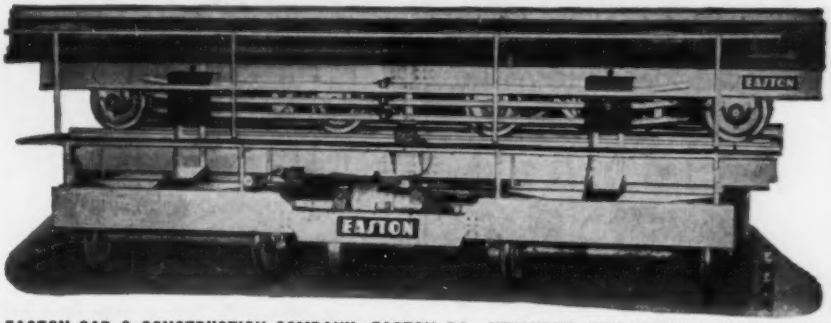
A-1033

EASTON

EASTON experience covers small and large capacity furnace cars for every requirement.

Furnace Cars

Electric furnace car mounted on electric transfer car for completely automatic continuous heat treating system.



EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH

INDUSTRIAL TRACK

Need Rails—Switches—Frogs—Guard Rails—Track Tools? For best selections, prompt deliveries—*try FOSTER*—shipments from stock in 5 nationwide warehouses.

Call on FOSTER for everything in Industrial Track Equipment and supplies.

RAILS New and Relaying

Send for Track Accessories Equipment Catalog #1-1

L. B. FOSTER CO.

STEEL SHEET PILING • PIPE • WIRE ROPE

PITTSBURGH 30, PA. NEW YORK 7, N.Y.
CHICAGO 4, ILL. HOUSTON 2, TEX.

Like to spend more time reading and less hunting? Turn to pages 2 and 3 of your IRON AGE EVERY week and let the **Digest of the Week in Metal Working** help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

—Tool Steels—

Continued

Vibro	**S1**
Braeburn Alloy Steel Div.	
Vulcan Calo-Ferro .30	**H21**
Vulcan Extra	**W1 (0.80 to 1.20 C)**
Vulcan Fort Pitt	**W1 (0.80 to 1.00 C)**
Vulcan Hi Pro	**D3**
Vulcan Magal	**H11**
Vulcan Non-Shrinkable	**O2**
Vulcan O. H.	**O1**
Vulcan Q. A.	**S1**
Vulcan Special	**W1 (1.20 C)**
Vulcan Special Vanadium	**W2 (0.90 C)**
Vulcan Special Vanadium	**W2 (1.00 C)**
Vulcan Super	**T2**
Vulcan Superior Chrome with Moly	**L7**
Vulcan TCM	**H12**
Vulcan TM-6	**M2**
Vulcan Crucible Steel Co.	

Vulcan Vairloy
A low temperature, air hardening, non-deforming tool steel. Contains C 1.00, Mn 2.00, Cr 0.90, Mo 0.90. Vulcan Crucible Steel Co.

Vulcan Vulcast	**H13**
Vulcan Vuldie	**A2**
Vulcan Crucible Steel Co.	
Victor Drill Rod	**W1 (Gr. 4)**
Crucible Steel Co. of America	
Victory	**M2**
Lehigh Steel Corp.	
Viking	**L7**
Vinco	**T1**
Braeburn Alloy Steel Div.	

Violet Label
Special oil-hardening, heavy duty, non-deforming steel for dies, punches and gages. Contains C 0.85 to 0.95, Mn 0.30 max., Si 0.20, Cr 0.50, W 1.50, V 0.20. Ackerlind Steel Co., Inc.

VLM
A molybdenum vanadium high-speed steel used largely for drills, taps and reamers. Contains C 0.85, Cr 4.00, Mo 8.00 and V 2.00. Allegheny Ludlum Steel Corp.

"I've been told that a time limit has been placed on my talk."

METAL STAMPING FACILITIES by Lansing at your Service for...

TRANSPORTATION EQUIPMENT
HOUSEHOLD APPLIANCES
ELECTRICAL EQUIPMENT
INDUSTRIAL EQUIPMENT
FARM IMPLEMENTS

Lansing Stamping Co.
ESTABLISHED 1914
LANSING 2 MICHIGAN

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

METAL CUTTING COST CUTTERS

STAR

moly power blades

Here's how to save at least 15% on power hack saw blade costs:

Ask your Distributor for STAR Moly Power Blades. You save 15% on initial blade cost—and you'll get *extra* economies from faster, more efficient cutting and longer blade life.

For over 70 years, STAR Blades have been *quality* blades—fine steel, carefully heat treated and processed on special machines of advanced design, makes STAR the blade you can count on.

BUY ALL YOU CAN
from your
DISTRIBUTORS' STOCKS

STAR Blades are sold only through recognized distributors—your best source of supply for not only STAR Blades, but hundreds of other products which keep your production going. Your industrial distributor gives you fast delivery from local stocks. He is close to your problems. He has the help of qualified factory representatives who know the answers to your problems. Buy whatever you can from him.

1833

CLEMSON BROS., Inc.
MIDDLETOWN, N. Y., U.S.A.
Makers of Hand and Power Hack Saw Blades, Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines.

—Tool Steels—

Continued

VM Dreadnought
A moly high speed steel, used where wear resistance and toughness are more important than red hardness. Contains C 0.86, Cr 4.00, V 2.00, Mo 8.00. Hawkridge Brothers Co.

Volcano H12
Lehigh Steel Corp.

Vulcan 4-HW
Chrome hot work tool steel for gripper dies, etc. Contains C 0.90, Cr 4.00, Mo 0.45, V 0.75. Vulcan Crucible Steel Co.

Vulcan 6-HW
A hot work steel. Contains C 0.60, Mn 0.30, Cr 4.00, V 0.75, Mo 0.45. Vulcan Crucible Steel Co.

Vulcan 4870 S5
Vulcan Alidie D2
Vulcan Crucible Steel Co.

Vulcan Blue Edge
A shock resisting chisel and punch steel. Contains C 0.50, Cr 1.00, W 1.00. Vulcan Crucible Steel Co.

Vulcan Calo-Ferro
Two types of tungsten hot work steel. One contains C 0.30, W 9.00, Cr 3.50, V 0.25. The other contains C 0.45, W 13.00, Cr 3.00, V 0.25. Vulcan Crucible Steel Co.

W

W. T.
Water or oil hardening tap and drill steel. Contains C 1.20, Mn 0.25, Si 0.25, Cr 0.40, V 0.35, W 1.40, Mo 0.25. Latrobe Steel Co.

W9 L6
Universal-Cyclops Steel Corp.

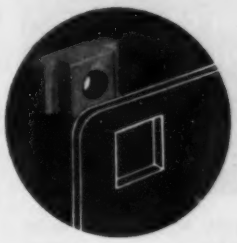
W. C. R.
A tungsten base hot work steel. Contains W 7.5 and Cr 7.5 Firth Sterling Inc.

Turn Page

"I like to raise a question of procedure—then leave it to the boys."

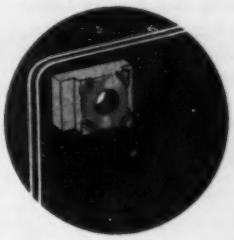
CLINCH-NUT "FAST-ON"

FABRI-STEEL "Fast On" clinch nuts increase thread area and use of lighter gage metal. They cut assembly, using shorter screws and speeding up assembly. Our engineers can help you improve your product. Send for detailed data sheets.



1
The square shape simplifies installation.

2
The small square portion is inserted and protrudes through the square hole that has been previously punched.



3
The protruding portion is now clinched at 4 corners with swaging tool.

4
Nut cannot work loose and variation in thickness of metal is taken care of automatically.

MILLIONS A DAY!

Automobiles	Farm Equipment
Refrigerators	Metal Furniture
Radio—TV	Military Tanks
Appliances	Ordnance Equipment

FabriSteel
PRODUCTS INCORPORATED
BOX 4745-1A • DETROIT, MICHIGAN
Phone KEnwood 2-1380

"SERV-RITE"

Insulated Thermocouple Wire Extension Lead Wire

FOR

PLATINUM COUPLES
CHROMEL ALUMEL
IRON CONSTANTAN
COPPER CONSTANTAN
IRON CUPRONEL

No matter what your wire or insulation requirements may be, you can depend on Gordon "Serv-Rite" insulated wire for pyrometers—recognized as a standard of highest quality for nearly half a century. All "Serv-Rite" wire is now manufactured in the new, completely modern Gordon plant, employing up-to-date equipment and machinery, supervised and operated by skilled technicians—your guarantee of continued precision quality. In addition to maintaining large stocks of all common types of wire, Gordon will manufacture special insulation, in long or short runs, to suit your individual needs and meet your most rigid specifications.

All Types of Insulation

Felted Asbestos
Asbestos Braid
Weatherproof Braid
Glass Braid
Polyvinyl Plastic
Nylon Braid
Stainless Steel Armored Braid
Silicone Treated
Cotton Braid
Lead Jacket

The home of "SERV-RITE"

Full Particulars on Request

4229

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors

Thermocouple Supplies • Industrial Furnaces & Ovens
Pyrometers & Controls • Metallurgical Testing Machines

Dept. 16 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 16 • 2035 Hamilton Ave., Cleveland 14, Ohio

—Tool Steels—

Continued

Wando O1
Universal-Cyclops Steel Corp.

Warplis O1
Pittsburgh Tool Steel Wire Co.

Washington W1

Washington Special W2
Jessop Steel Co.

Water Hardening Tool Steels W1 (1.00C)

Water Hardening Tool Steels W2 (1.00C)
Detroit Steel Corp.

WATERcrat W1
Marshall Steel Co.

Waterdie Extra W1 (1.00C)

Waterdie Standard W1 (1.00C)
Columbia Tool Steel Co.

Wesson
Brand name of a line of carbides.
Wesson Co.
(See "Carbides" section, Jan. 8, 1953, issue.)

Whelco "M" L6

Whelco Standard W2
Wheelock, Lovejoy & Co., Inc.

White Label
A non-deforming, air hardening steel for heavy stamping dies, coining and cold forming dies, etc. Contains C 1.55, Mn 0.40, Si 0.37, Cr 11.50, Mo 0.80, V 0.40. Peninsular Steel Co.

White Label W1
Swedish-American Steel Corp.

White Label W1 (0.90C)
A. Milne & Co.

White Label W2
Ackerlind Steel Co., Inc.

Willey
Brand name of a line of carbides.
Willey's Carbide Tool Co.
(See "Carbides" section, Jan. 8, 1953, issue.)

Windsor A2
Jessop Steel Co.

Wizard
An oil and water hardening steel, for pneumatic chisels, shock tools, chisels, etc. Contains C 0.45, Mn 0.35, Si 0.30, Cr 0.80, W 0.85. Agawam Tool Co.

WKZ H21
Raven Steel & Tool Co.

Woco
Steel for shock tools. Contains C 0.45, Cr 1.00, W 2.50. Bissett Steel Co.

Wolfram T1

Wolfram Cobalt T4
Vulcan Crucible Steel Co.

WW Hotwork
A W-Cr hot work die steel; for applications requiring resistance to heat-checking and wear at high temperatures. Contains C 0.32, W 12.00, Cr 12.00, V 1.00. Vanadium-Alloys Steel Co.

X

X W1
Bethlehem Steel Co., Inc.

X-10 W1 (1.00C)
Atlas Steels Ltd.

X-12 W1 (1.20C)
Atlas Steels Ltd.

X. L. S1
Latrobe Steel Co.

XCL W1
Bethlehem Steel Co., Inc.

XDH
Hot work steel, same as Blue Chip, for shear blades and glass molds. Has high heat resistance. Contains C 0.55, Cr 4.00, V 1.00, W 18.00. Firth Sterling Inc.

XDL
Hot work steel, for extrusion dies and punches. Has resistance to abrasion and heat. Contains C 0.40, Cr 3.50, V 0.50, W 14.50. Firth Sterling Inc.

XDM
A hot work steel, for hot work dies and extrusion dies. Has resistance to heat and shock. Contains C 0.52, Cr 4.00, W 17.75, V 0.90. Firth Sterling Inc.

XX W1
Bethlehem Steel Co., Inc.

XX95 W1 (0.90C)
Atlas Steels Ltd.

XXX W1
Bethlehem Steel Co. Inc.

Y

Yellow Label
A medium carbon, oil hardening grade. Detroit Steel Corp.

Yellow Label
A non-deforming, oil hardening steel for punches, gages, intricate shape dies. Contains C 0.90, Mn 1.20, Si 0.25, Cr 0.50, V 0.20, W 0.50. Peninsular Steel Co.

"Well, I hope you enjoy your work here, Barnes. But just remember the blonde at the first typewriter is mine."

Yellow Label W1 (Gr. 1&2)
Wm. Jessop & Sons, Ltd.

Z

Zip
An oil hardening steel, for lathe, planer, shaper tools for cutting and machining cast steel. Contains C 0.65 to 0.70, Mn 0.30, Si 0.35, Cr 4.00, Co 7.00 to 8.00, V 1.50 to 1.75, W 17.00 to 18.00, Mo 0.70 to 1.0. Agawam Tool Co.

Zivco
A plain carbon steel. Ziv Steel & Wire Co.

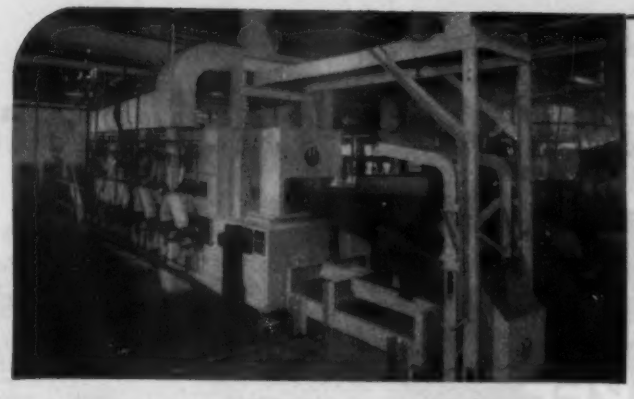
Ziv's Regular
A plain carbon steel. Ziv Steel & Wire Co.

ZTM
Die casting steel especially designed for zinc die casting dies or casting other low melting point materials. Contains C 0.35, Mn 0.75, Si 0.55, Cr 0.80, Mo 0.35. Latrobe Steel Co.

MORE ON CARBIDES

Brand names of carbides made by principal producers appear throughout this directory. Lack of space in this issue has made it impossible to include brief descriptions of each of the grades made by these companies. However, the complete listings will appear in the Jan. 8 issue of The Iron Age and they will be included in the "Iron Age Directory of Tool Steels and Carbides" when it is published later this year.

"We've cut absenteeism to the bone with this new set-up for rest periods."



LOW COST HEAT TREATMENT
of small and medium size parts

● EF chain belt furnaces are the most satisfactory heat treating equipment yet devised for carbon restoration, scale free hardening and hardening without decarburization of small and medium size parts. Built in 11 standard sizes for capacities up to 2,000 lbs. per hour. Larger sizes to meet any requirement. Gas-fired, oil-fired or electrically heated, whichever best suits your particular requirement – and location. Estimates of equipment, installation and operating costs – and samples of treated parts–furnished promptly. Write for literature.

EF
GAS-FIRED OIL-FIRED and ELECTRIC FURNACES
for
AGING
ANNEALING
BRAZING
CARBON RESTORATION
CARBURIZING
CERAMIC DECORATING
DRAWING
HARDENING
HOMOGENIZING
MALLEABLIZING
NORMALIZING
NITRIDING
SINTERING
SOLUTION TREATING
SPECIAL ATMOSPHERE TREATMENTS

A SIZE AND TYPE OF FURNACE FOR EVERY PROCESS PRODUCT OR PRODUCTION

THE ELECTRIC FURNACE CO.
GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
Salem - Ohio

Canadian Associates ● CANEFCO LIMITED ● Toronto 1, Canada

APEX INSERTED-BLADE METAL-CUTTING TOOLS

Here's a "BIG BULL" Cutter
for your
HEAVY DUTY JOBS

APEX offers many cutters for many jobs. Here's one that takes a big chip fast. It can be had with H.S.S., Stellite, Cobalt or Carbide tipped blades. These blades adjust automatically in two directions. No damage to carbide tips. Diameters from 8" to 24". We also make cutters for *lighter* work. Write for catalog.

APEX TOOL & CUTTER CO., Inc., Shelton 12, Conn.

LOCK JOINT
Specialty
As Welded

Meets All Specifications.
Best Fabricating Qualities.
HELICAL TUBING

Welded and Cold Drawn Stainless Steel Tubing
Special Purpose Tubing In All Available Materials

For full detailed information about Helical Tubing, send today for your HETCO Catalog.

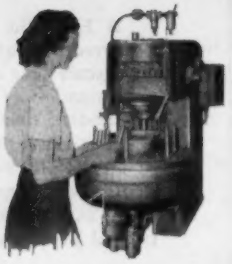
HELICAL TUBE CORPORATION
19 Washington St., East Orange, N. J.
Manufacturing Plant—Grand Rapids, Michigan

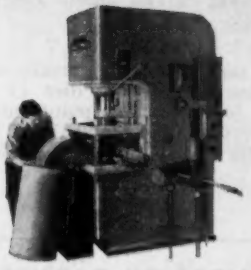
A GOLD MINE OF

Job-Proved, Cost-Cutting, Production Helps

Methods and Production Case Records on a wide range of actual operations

FREE





See how *others* cut costs with

MULTIPRESS®

Facts and figures from hundreds of actual users tell *how* and *why* the smooth oil-hydraulic power and control of Multipress cuts production costs. Our Data Log reports on these applications may offer better answers to some of your own production needs.

Multipress offers complete adjustability of ram speed, pressure and stroke length.

Pressures build up instantly as the ram contacts the work . . . there's no hammer-blow impact on work or tooling.

With Multipress Index Table Feeds, work can be loaded on multiple fixtures that index to the press ram automatically at speeds up to 70 per minute — often keeping two or more operators busy at top speed.

Automatic time delay, for ram dwell or hold-down, is easily provided with Multipress.

Many other types of valving, ram controls, auxiliary feeds, operating accessories and tooling attachments can be interlocked with the Multipress ram action. Let us send you full details on Multipress.

Write Today for Data Logs on types of operations your production requires.

DENISON Hydr OIL ics

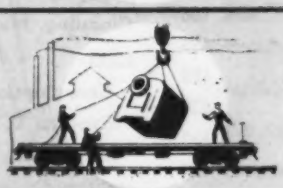
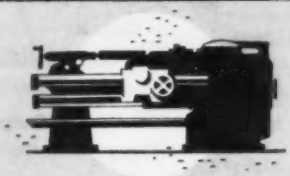
TRADE MARK

The DENISON Engineering Company **1158 Dublin Road, Columbus 16, Ohio**

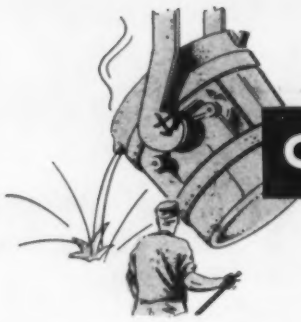
The Iron Age

1953 METAL INDUSTRY FACTS

SECTIONS

1		Steel Industry . . p. 399
2		Nonferrous Metals p. 415
3		Raw Materials . . p. 425
4		Metal Products . . p. 437
5		Casting, Forging . p. 449
6		Machinery . . . . . p. 457
7		Market Data . . . p. 463
8		Labor, Safety . . . p. 479

Complete Index on Next Page



COMPLETE INDEX TO FACTS

A

Accidents to All Workers, 1949-50 . . 485
Aircraft, Employment, Wages 443
Air Pollution Control Ordinances, Check List 456
Alloy Steels
- In Auto 439
- Ingot Production 401
- Shipments 403

Alloys, High Temperature Jet Engine, Analyses 452
Aluminum
- Distribution by Consuming Industries 417
- Exports, U. S. 416
- Imports, U. S. 416
- Production, U. S. 416
- Production, World, Since 1942 . . . 417

Aluminum Castings, Shipments . . . 453
Aluminum Extrusions, Shipments . . 416
Aluminum Foil Shipments 416
Aluminum Prices
- Cast Scrap 416
- Ingot, Remelt, No. 12 416
- 99 Pct Plus 417

Aluminum Refining Industry, Hours and Earnings 485
Aluminum Scrap, Prices 416
Aluminum, Secondary, Recovery of 416
Aluminum Wrought Products, Shipments 416
Antimony
- Imports by U. S. 419
- Prices, 1929-1950 420
- Production, U. S. 420
- Production, World 419

Appliance Employment 445
Appliances, Domestic Cooking, Shipments 444
Appliances, Electrical
- Index of Sales 445
- Steel Products Used in 438

Appliances, Heating, Shipments . . 444
Appliances, Household Sales . . 444, 446
Associations
- Addresses 474, 475, 476
- Index of 470, 471, 472, 473

Automobile
- Alloy Steels in 439
- Steel for Parts 438
- Steel Used in a Typical 439
- What Makes an Auto 439

Automobile Industry
- Employment, Wages 440
- Production by Company 440
- Steel Shipped to 440
- Steel Used 439

B

Bars
- Cold Finished, Prices Pittsburgh . 410
- Hot-Rolled, Shipments 412
- Merchant, Prices, Pittsburgh 410

Bauxite, Imports into U. S. 417
Bearings, Ball, Imports 458
Bearings, Roller, Imports 458
Blast Furnaces
- Capacity by States 405, 406
- Capacity of Active Units 426
- Capacity, U. S. 405
- in U. S. 426
- Installed, 1952 413
- Materials Used for Pig Iron 426
- Production, Canada 427

Boilers and Radiation, Cast Iron, Shipments 452
Brass Ingots
- 88-10-2 (245), Prices 419
- Shipments 419

Brass Scrap, Prices 419
Brazing Depts. 460
Brick
- Chrome Prices 436
- Fire Clay Prices 436
- Magnesite Prices, Baltimore . . 436
- Silica Prices 436

Bronze Ingots
- 88-10-2 (245), Prices 419
- Shipments 419

Buffing Depts., Number Operated . . 468
Business Sales and Inventories . . 448

C

Cadmium
- Exports, U. S. 423
- Imports by U. S. 423
- Prices 423
- Production, U. S. 423

Calendar of Events 477, 478
Canada
- Finished steel, production and shipments 403
- Steel Capacity 403
- Steel Output 403

Cars, Freight, Delivered 442
Cars, Railroad Passenger, Ordered . 442
Cast Iron Radiation Shipments . . 452
Castings, see Specific Type and Metal
Chromite
- Imports 435
- Ore Shipments 435
- World Production 435

Cleaners, Metal, Use by Type 467
Cleaning, Metal, In Plants 468
Coal
- Consumption, U. S. 1930-50 432
- Exports, U. S. 432
- Production, U. S. 432

Coal Employment and Wages . . . 431
Cobalt
- Consumption, U. S. 421
- Prices 421
- World Output 421

Coke
- Blast Furnace Receipts 433
- Capacity, U. S., by Companies . . 404
- Capacity, U. S., by States . . . 404, 405
- Consumption by Blast Furnaces . 433
- Consumption in Steelmaking . . . 433
- Production, U. S. 433
- U. S. Foreign Trade 433

Coke and Byproducts Industry, Employment, Hours, Earnings 434
Coke Prices
- Foundry, Connellsville 433
- Furnace, Connellsville 433

Construction, Expenditures for New 447

Consumer Expenditures, Classified 448
Consumers' Price Index in Cities .. 483
Conveying Equipment Sales Index 461
Copper
Consumption of Refined 418
Exports of Refined, U. S. 418
Imports, U. S. 418
Mine Production, U. S. 418
Production of Crude, U. S. 418
World Production 417
Copper Castings, Shipments 453
Copper, Electrolytic, Prices, Conn. Valley 418
Copper Powder
Prices 454
Shipments 454
Copper Scrap, No. 1 Heavy, Prices 418
Copper, Secondary, Recovery 418

D

Death Rates by Industries 485
Death Rates, Occupational 485
Degreasing or Washing Depts. .. 468
Die Casting Shops in U. S. 455
Diecastings, Copper, Shipments .. 453
Diecastings, Lead, Shipments 453
Diecastings, Zinc, Shipments 453
Durable Goods, Employment, Hours Earnings 480

E

Earnings, Spendable Weekly 485
Earnings, see also Pay Rolls
Electric Motor Exports, Quantity and Value 458
Electric Power Production 445
Electrical Equipment Makers, Steel Used by 461
Electrode, Welding, Shipments ... 460
Electroplating Depts. 468
Employees
by Selected Industries 481
by Type 481
Manufacturing, by States 482
Employment
Federal Civilian 483
Federal Civilian Pay Rolls 483
In Steel Industry 480
Metalworking Iron Age Census 486, 487, 488
Exports, see Specific Product

F

Farm Machinery, Manufacture ... 442
Federal Civilian Payrolls 483
Federal Civilian Workers 483
Ferromanganese
Shipments by U. S. Furnaces ... 436
80 pct, Prices 435
Ferrosilicon
50 Pct, Prices 435
Imports, U. S. 436
Production by U. S. Furnaces .. 436
Financial Analysis of the Steel Industry 414
Finished Steel
Canadian, Production and Shipments 403
Iron Age Composite Price 409
Finishing Shops 468
Forge Shops in Operation 455
Forging Industry, Earnings 452
Forgings, Steel, Shipments 452
Foundries, Gray Iron
Earnings and Hours 450
Number Operated 455
Foundries, Iron and Steel, Employment and Earnings 450
Foundries, Malleable Iron
Number Operated 455
Foundries, Nonferrous
Labor 453
Number Operated 455
Foundries, Steel
Employment Hours, Earnings ... 450
Number Operated 455
Foundry Equipment, Orders and Shipments 452
Freight Car Steel Requirements .. 441
Freight Cars Delivered 442
Freight, Revenue, Cars Loaded ... 444
Furnaces, Industrial, Sales 453

G

Galvanizing or Tinning Depts. 468
Gear Orders, Index 459
Generators and Motors, Integral HP, Index of Orders 445
Gray Iron Castings, Hours, Earnings 450
Gray Iron Castings, Shipments... 451
Gray Iron Shipments 450

H

Hardware, Retail Sales 446
Heat Treating Shops 455
Household Appliances, see Appliances
Housing, Non-Farm Units Started .. 447

I

Imports, see Specific Product
Income, Personal, Disposition of .. 444
Indexes
Carloadings 469
Construction Contracts 469
Consumer Goods 469
Department Store Sales 469
Employment and Payrolls 469
Industrial Production (FRB) 469
Wholesale Prices 469
Induction Heating
Applications 465
Uses in 1456 Plants 464
Work Handling Equipment 465
Industrial Production, Federal Reserve Index 443, 469
Ingots, see also Specific Metal
Injury Rates by Industry 484
Iron Mining Employment, Wages .. 430
Iron Ore
Consumption, U. S. 429
Production, U. S. 1930-50 430
Production, World 430
Iron Ores, Lake Superior
Analyses 429
Prices 429
Shipments 429
Iron Powder
Prices 454
Imports 454
Shipments 454

J

Jet-Engine Alloys, High Temperature, Analyses 452

L

Labor Force, Total U. S., by Type .. 481
Labor Turn-Over Rates in Manufacturing Industries 484
Lacquering and Painting Depts.... 468
Lead Powder, Shipments 454
Lead, Prices, N. Y. 421
Lead, Secondary, Recovery in U. S.. 422
Locomotives Ordered in U. S..... 440

M

Machine Tool Industry, Workers .. 461
Machine Tool Labor 461

COMPLETE INDEX CONTINUED

Machine Tools
- Exports by Types ... 462
- Imports by Country of Origin ... 462
- by Types ... 462
- Index of Orders and Shipments ... 458
- Manufacture by States ... 459
- Production of Selected Types ... 459

Machinery, Electrical, Employment, and Earnings ... 482
Machinery, Farm, Manufacture ... 441
Machinery Makers' Sales ... 459
Machinery Manufacturers Financial Data ... 459
Machinery, Metalworking, Industry, Employment, Hours, Earnings ... 485
Magnesium
- 99.8 Pct Plus, Prices ... 423
- Consumption ... 422
- Output and Use ... 422
- Production, U. S. ... 422
- Production, World ... 422

Magnesium Castings, Shipments and Unfilled Orders ... 453
Magnesium, Secondary, Recovery ... 423
Malleable Castings, Production, Shipments and Orders ... 451
Manganese Ore
- Imports for Consumption, U. S. ... 434
- Shipments by U. S. ... 434
- World Production ... 434

Manganiferous Ores, Shipments by U. S. Producers ... 434
Manufacturers' Association ... 470
Manufacturing, All, Employment and Wages ... 483
Manufacturing Industries
- Indexes of Production-Worker ... 484
- Labor Turn-Over Rates ... 484
- Spendable Weekly Earnings ... 485

Meetings, Coming ... 477, 478
Mercury
- U. S. Statistics ... 424
- World Production ... 424

Metal, All, Mining, Employment and Earnings ... 480
Metal Cleaners, Use ... 467
Metal Cleaning Depts. ... 468
Metal Powder Part Plants ... 456
Metal Powder Parts, Industry Use ... 465
Metal Products, Earnings ... 480
Metal Washing Depts., Number Operated ... 468
Metalworking Machinery Industry, Employment, Hours, Earnings ... 485
Mining, All Metal, Employment ... 480
Molybdenum
- U. S. Production ... 424
- World Production ... 424

Motor Vehicle Production by Company ... 440
Motors and Generators, Index of Orders ... 445

N

Nickel
- Consumption, U. S. ... 420
- Imported by U. S. ... 420
- Production, U. S. ... 420
- Production, World ... 420

Nickel, Electrolytic, Prices ... 420
Nonferrous Metal Finishing Employment, Hours, Earnings ... 424
Nonferrous Metal Manufacturing, Employment, Hours, Earnings ... 424

O

Openhearth Furnaces, Installed in 1952 ... 413
Ordnance Equipment, Employment ... 486

P

Painting and Lacquering Depts. ... 488
Passenger Car, Output by Company 440
Passenger Car, Steel in ... 439
Pay Rolls, Federal Civilian ... 483
Pickling Depts., Number Operated ... 468
Pig Iron
- Canadian Capacity ... 427
- Exports, U. S. ... 426
- Imports, U. S. ... 426

Pig Iron Prices
- Basic, Mahoning, Shenango Valley ... 428
- Charcoal, Chicago ... 428
- Composite ... 428
- Malleable, Mahoning, Shenango Valley ... 429
- Foundry, Birmingham ... 428
- Foundry, Buffalo ... 429
- Foundry, Chicago ... 429
- Foundry, Granite City ... 428
- Foundry, Mahoning, Shenango Valley ... 428

Pig Iron Production
- by States ... 427
- Canadian ... 427
- in 21 Countries ... 426
- Material Used by Blast Furnaces, 1950 ... 426
- Number of Blast Furnaces Used by State ... 428
- U. S. ... 427
- World ... 426

Pipe
- Buttweld Steel, Prices, Pittsburgh 410
- Cast Iron, Shipments ... 451
- Cast Iron Water, Prices, N. Y. ... 410
- Soil and Pressure, Gray Iron Shipments ... 451

Pipe and Tubing, Shipments ... 412
Plant Equipment Spending ... 447
Plant Workers, Index of ... 484
Plates
- Prices, Pittsburgh ... 411
- Shipments ... 412

Polishing Depts., Number Operated 468
Powder Metal, see Specific Metal
Pressed Metal Earnings ... 453
Production, Industrial, Federal Reserve Index, ... 443, 469

R

Radiation, Cast Iron Shipments ... 452
Railroad Equipment, Employment ... 442
Railroad Locomotives Ordered ... 440
Railroad Freight Cars
- Delivered ... 442
- Requirements ... 441

Railroad Passenger Cars
- Ordered ... 442
- Steel Used in ... 440

Railroads, Employment and Wages 443
Rail Steel, Re-rolled, Shipments ... 413
Rails, Steel, Prices Pittsburgh ... 411
Refrigerator, Steel Used in ... 439
Refrigerators, Household, Index of Sales ... 444
Rolling Mill Installations, 1952 ... 413
Rust Preventives, Use ... 466

S

Sales, Business, and Inventories ... 448
Sand Blasting Depts. ... 488
Scrap
- Consumers' Inventories ... 431
- Consumption, U. S. ... 432

Scrap Prices
- Aluminum ... 416
- Brass ... 419
- Composite ... 432
- Copper ... 418
- Cupola Cast, Cincinnati ... 431
- Heavy Melting, Chicago ... 431
- Heavy Melting, Philadelphia ... 431
- Heavy Melting, Pittsburgh ... 431
- Machinery Cast Chicago ... 431

Shapes, Structural
Shipments ... 412
Steel Prices, Pittsburgh ... 410
Sheet Metal Departments, Number Operated ... 457
Sheets, Cold-Rolled, Prices, Pittsburgh ... 411
Shipments ... 412
Sheets, Galvanized
Prices, Pittsburgh ... 411
Shipments ... 412
Sheets, Hot Rolled
Prices, Pittsburgh ... 411
Shipments ... 412
Sheets, Stainless Steel No. 304, Prices ... 411
Shipbuilding Employment, Wages ... 443
Spiegeleisen, 19 to 21 Pct, Prices ... 435
Spiegeleisen Production, U. S. ... 436
Stainless Steel
Ingot Production by Type Nos ... 401
Sheets No. 304, Prices ... 411
Shipments ... 403
Stamping Plants ... 454
Steel
Capacity, by States ... 407, 408, 409
Capacity, U. S. by Type and Company ... 406, 407
Distribution by Consuming Industries ... 402
Operating Rates ... 401
Operating Rates, Pct of Capacity ... 401
Production ... 400
Shipments to Warehouses ... 412
Steel, Alloys, see Alloy Steels
Steel Castings
Earnings ... 450
Production, Sales, Orders by Type ... 450
Shipments by Types of Furnace and Grade ... 451
Steel Consumption
by Auto Industry ... 439, 440
by Electrical Equipment Makers ... 461
for Automobile Parts ... 438
for R. R. Freight Cars ... 441
for R. R. Passenger Cars ... 440
in a Container ... 438
in a Piano ... 439
in a Refrigerator ... 439
in Homes ... 438
in Passenger Car ... 439
in Typical Automobile ... 439
per Railroad Freight Car ... 441
Products Used in Electrical Appliances ... 438
Steel, Finished, Composite Price ... 409
Steel Forging Industry, Earnings, Hours ... 452
Steel Forgings, Shipments ... 452
Steel Industry
Employees, Hours, Earnings ... 480
Financial Analysis ... 414
Steel Ingots
Production ... 400
U. S. Production ... 400
Steelmaking
Capacity Installed in 1952 ... 413
Consumption of Coke ... 433
Openhearth Furnaces Installed, 1952 ... 413
Steel Mills, Employment and Wages ... 480
Steel Prices ... 410, 411
Steel Production
Alloy Steel Ingots ... 401
Capacity ... 400
Ingots ... 400
Operating Rates ... 401
Operating Rates, Pct of Capacity ... 400
Per Capita ... 400
World ... 401
Steel Production, Canadian
Finished Steel ... 403
Ingot Capacity and Rates ... 403
Ingots and Steel for Castings ... 403
Steel Products
Shipments to Warehouses ... 412
Shipments and Production for Sale ... 402
Used in Electrical Appliances ... 438
Steel Rails, Prices, Pittsburgh ... 411
Steel, Re-Rolled Rail, Shipments ... 413
Steel Rolling Mill Installations, 1952 ... 413
Steel Shipments
Alloy ... 403
Canadian Finished ... 403
Finished ... 402
Products ... 402
Products to Warehouses ... 412
Re-rolled Rail ... 413
Stainless ... 403
Strip, Cold-Rolled
Prices, Pittsburgh ... 411
Shipments ... 412
Strip, Hot Rolled
Prices, Pittsburgh ... 411
Shipments ... 412

T

Technical Societies ... 470
Testing, Physical, Depts. ... 468
Tin, Straits, Prices, N. Y. ... 421
Tinning or Galvanizing Depts. ... 469
Tinplate, Prices, Pittsburgh ... 410
Tool Steel, High Speed, Prices ... 410
Tractors, see Farm Tractors
Trade Associations ... 470
Transportation Earnings ... 485, 488
Truck and Trailer Production, Shipments ... 443
Truck, Output by Company ... 440
Tubing, see Pipe and Tubing

U

Unions, Total Members ... 443

V

Vacuum Cleaner Sales, 1925-51 ... 443
Vanadium, World Production ... 424

W

Warehouses, Steel Shipments to ... 412
Washing or Degreasing Depts. ... 468
Welding, Arc, Machine Orders ... 460
Welding, Arc or Gas, Shops ... 460
Welding, Arc, Set Orders ... 460
Welding Electrode Shipments ... 460
Welding, Resistance, Shops ... 460
Wire and Wire Products, Shipments ... 412
Wire, Bright, Prices, Pittsburgh ... 410
Wire Rope, Use by Industry ... 467
Work Stoppages, 1927-1951 ... 482
Workers
Death Rates ... 485
Federal Civilian ... 483
Indexes of Plant ... 484
Spendable Weekly Earnings ... 485

Z

Zinc
Exports ... 423
Imports into U. S. ... 422
Prime Western, Prices at N. Y. ... 423
Zinc Castings, Shipments ... 453
Zinc Powder, Prices ... 454
Zinc, Slab, Consumption by Industry ... 422

SPOTLIGHTING 1952 IMPORTANT EVENTS OF THE YEAR

Markets and Prices

Apr. 29—Lead prices begin skid from 19¢ per lb ceiling. Market dips 2¢ in week as result of low demand, much improved supply. Imports high.

May 8—Chile breaks off copper contract, seeking boost from 27.50¢ per lb price.

June 2—Zinc price plummets, tin demand sags with start of steel strike.

June 19—Office of Price Stabilization allows 3.84¢ per lb increase in brass mill ceilings after eliminating copper import price lid and permitting pass-through of 80 pct of extra cost.

Aug. 1—Ban lifted on private importation of tin after 16 months.

Aug. 12—Ferromanganese rises $40 a ton.

Aug. 14—OPS grants steel price increase of about 4.7 pct retroactive to July 26, the end of the strike. THE IRON AGE finished steel composite jumps from 4.131¢ to 4.376¢ per lb.

Sept. 4—Aluminum and copper move to Group II (materials in approximate balance) but dry weather begins to be felt at aluminum plants.

Sept. 8—Pig iron goes up $2.50 a ton (about 4.7 pct) retroactive to July 26.

Sept. 18—Calumet & Hecla allowed copper ceiling increase to 27.50¢ because of high-cost mines. Industry voice for scrapping of copper price control gets louder.

Oct. 22—Lead hits a low of 13.50¢ per lb. Price off 2.50¢ in 3 weeks after freeing of lead on London Metal Exchange and virtual dumping of British government stocks.

Nov. 12—Lead up to 14.50¢ again as U. S., British markets show strength. Ministry of Materials will not dump zinc when it is opened for civilian trade about Jan. 1.

Production

Jan. 21—Erie Mining Co. plans to spend $300 million on taconite project in Minnesota.

Apr. 3—Air Force gets started on huge heavy press program. At least 17 forging and extrusion presses ranging to 50,000 tons capacity are involved.

May 30—Monthly production of magnesium tops 9000 tons for first time since World War II as government plants hit full stride. Use running about 4000 tons, remainder to stockpile.

July 24—More than 19 million tons of steel production lost because of strike.

Aug. 14—U. S. aluminum capacity passes the million-ton mark.

Aug. 21—Freight car building program derailed by steel shortages resulting from strike.

Oct. 9—Government announces third round aluminum expansion goal of 200,000 tons, preferably from new producers using non-hydro power.

Nov. 6—U. S. machine tool imports hit peak, causing concern to domestic builders.

Nov. 6—Tin mining formally nationalized by Bolivia, as world watches anxiously.

Nov. 17—Further power cuts go into effect in Northwest. Aluminum loss due to reductions in both firm and interruptible power total. 4600 to 4700 tons a week. But more non-hydro plants are coming into production.

Nov. 20—Steel industry task force recommends lifting of controls over steel, except for military and atomic energy needs, not later than Apr. 1, 1953. They ask open-end CMP at once.

Nov. 20—In asking end of controls, steel task force forecasts 1953 production of 118.8 million net tons, of which no more than 14 million would be needed for military and atomic energy uses.

Nov. 20—Steelmaking operations scheduled at 107 pct of rated capacity for fifth consecutive week.

Nov. 20—Stock huge magnesium surplus, as output more than doubles combined civilian and military use.

Nov. 27—An IRON AGE survey shows more than 7.2 million net tons of steel capacity being added during 1952, raising total capacity at year-end to nearly 116 million net tons. New capacity expected early in 1953 will bring industry close to 120 million ton goal.

Labor

Jan. 4—USWA special convention postpones steel strike call to Feb. 24.

Jan. 10—In answer to union demand for 15¢ an hr wage increase and at least that much more in fringe increases, U. S. Steel gives wage position in "Statement of Facts."

Mar. 20—Wage Stabilization Board finally makes recommendations in steel wage case referred to it Dec. 22, 1951. Recommends wage and fringe benefits totaling 26¢ an hr and union shop. Union promptly accepts; companies decline. Union shop is blocking issue.

Apr. 8—President Truman seizes steel industry.

June 2—Supreme Court overthrows seizure of steel industry, declaring it unconstitutional. Truman directs Sawyer to return industry to owners. Steelworkers begin 54-day strike.

July 23—John L. Lewis serves 60-day notice of termination of coal wage contract.

July 26—Longest and costliest strike in history of steel industry ends. Steelworkers win wage package totaling 21½¢ per hr. Workers retain freedom to choose whether or not they wish to belong to union.

July 28—Aluminum Co. of America and United Steelworkers of America reach wage agreement after 5-year accord had already been reached with Aluminum Workers Council (AFL). Total wage increase is 21.4¢ per hr.

Sept. 20—Coal wage agreement reached between John L. Lewis and Harry Moses calling for increase totaling $1.90 per day. WSB approves only $1.50 per day, and operators agree to hold balance in escrow pending final decision to get miners back to work.

Nov. 8—Philip Murray, president of Congress of Industrial Organizations and United Steelworkers of America, dies suddenly.

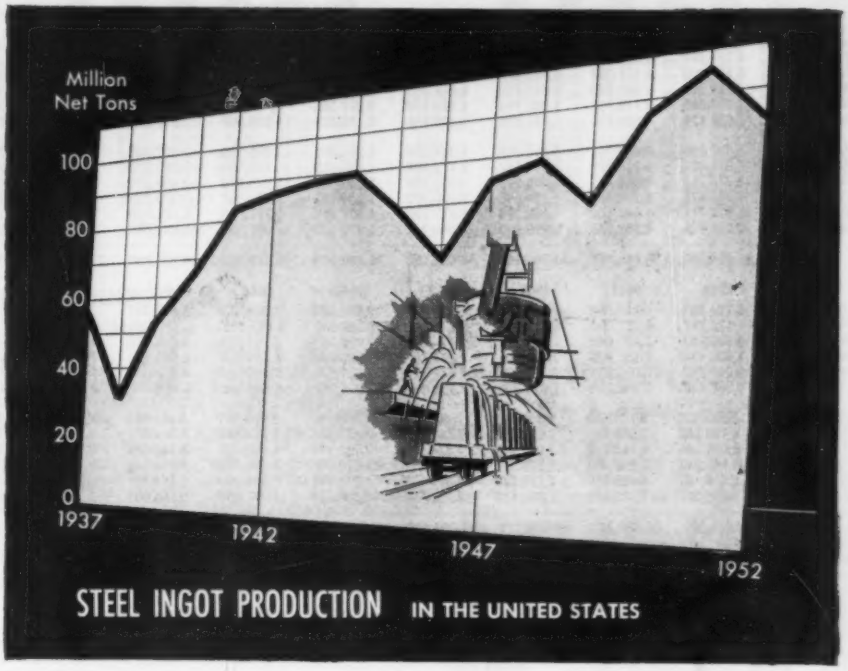
Nov. 21—William Green, president of American Federation of Labor, passes away.

Dec. 4—Walter P. Reuther elected president of CIO.

The Iron Age
METAL INDUSTRY FACTS
SECTION 1

STEEL INDUSTRY

PRICES • PRODUCTION • CAPACITIES • SHIPMENTS



IN THIS SECTION:

Page

CANADIAN IRON & STEEL
- Finished Steel Production and Shipments 403
- Steel Production 403
- Steelmaking Capacity 403

CAPACITY
- Blast Furnaces, U. S. 405, 406
- Canadian 403
- Coke, U. S. 404, 405
- New Installations
  - Rolling Mill 413
  - Steelmaking 413
  - Blast Furnaces 413
- U. S. by States 407, 408, 409
- U. S. by Type and Company .. 406, 407

CAPACITY, NEW
- Blast Furnaces 413
- Rolling Mills 413
- Steelmaking 413

DISTRIBUTION
- By Consuming Industries 402

FINANCIAL ANALYSIS 414

INGOT PRODUCTION
- Alloy Steel 401
- Stainless Steel 401
- Steel 400
- World Production 401

OPERATING RATES 401

PRICES
- Bars
  - Cold-finished 410
  - Merchant 410
- Finished Steel Composite 409
- Pipe
  - Butweld 410
  - Cast Iron Water 410
- Plates 411
- Rails 411

Page

- Sheets
  - Cold-rolled 411
  - Galvanized 411
  - Hot-rolled 411
  - Stainless Steel 411
- Strip
  - Cold-rolled 411
  - Hot-rolled 411
- Structural Steel Shapes 410
- Tinplate 410
- Tool Steel, High Speed 410
- Wire, Mfrs'. Bright 410

PRODUCTION
- Canadian 403
- Ingots
  - Alloy Steel 401
  - Stainless Steel 401
- Steel 400
- World Production 401
- Per Capita 400

Page

SHIPMENTS
- Alloy Steel 403
- Canadian Finished Steel 403
- Finished Steel 402
- Rerolled Rail Steel 413
- Stainless Steel 403
- Steel Products 402
- Warehouses, Steel Products to .. 412

STAINLESS STEEL
- Ingots Produced 401
- Prices, Sheets 411
- Shipments 403

STEEL PRODUCTS
- Shipments and Production for Sale 402

WAREHOUSES, STEEL SHIPMENTS TO 412

1 STEEL INDUSTRY

Steel ingot production, by furnace type, operating rates, per capita production. Monthly ingot production, 1927 to 1952.

STEEL INGOT PRODUCTION

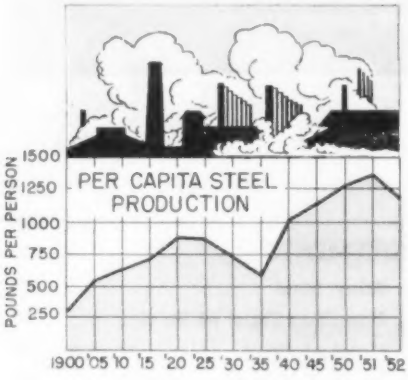
Openhearth, Bessemer and Electric Furnace Ingots and Steel for Castings, Net Tons; U. S. Only

	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
Jan.	4,302,172	4,531,172	5,115,195	4,288,212	2,852,540	1,685,665	1,157,745	2,276,596	3,279,473	3,474,353	5,398,326	1,984,815	3,863,084
Feb.	4,327,341	4,590,842	4,920,348	4,579,761	2,892,154	1,681,421	1,221,664	2,521,472	3,169,909	3,379,587	5,050,824	1,942,795	3,448,120
March	5,148,330	5,117,384	5,760,878	4,828,571	3,488,208	1,627,030	1,022,675	3,190,040	3,273,910	3,810,436	5,970,247	2,293,884	3,929,387
April	4,685,249	4,688,226	5,626,610	4,664,182	3,141,887	1,429,848	1,531,813	3,346,922	3,017,177	4,494,782	5,801,540	2,196,413	3,431,600
May	4,594,340	4,776,766	6,008,754	4,520,520	2,897,385	1,277,302	2,250,236	3,875,202	3,009,245	4,614,529	5,894,260	2,081,189	3,372,638
June	3,969,129	4,250,736	5,573,076	3,879,960	2,416,078	1,036,102	2,919,687	3,487,812	2,580,771	4,543,888	4,787,710	1,868,848	3,606,729
July	3,637,255	4,320,783	5,813,546	3,316,654	2,143,351	915,738	3,607,288	1,697,879	2,591,240	4,473,940	5,212,832	2,259,677	3,648,639
Aug.	3,971,467	4,744,291	5,614,144	3,473,898	1,949,462	961,153	3,260,279	1,574,649	3,331,770	4,782,442	5,580,683	2,903,805	4,341,726
Sept.	3,710,754	4,709,416	5,146,744	3,223,766	1,754,817	1,125,892	2,599,370	1,446,551	3,227,876	4,744,841	4,907,592	3,029,736	4,881,601
Oct.	3,764,573	5,279,460	5,154,063	3,055,972	1,805,653	1,233,957	2,373,729	1,689,272	3,590,945	5,182,430	3,881,819	3,554,912	6,223,126
Nov.	3,549,711	4,844,460	4,002,385	2,510,820	1,807,315	1,171,710	1,731,930	1,836,068	3,599,687	4,941,014	2,464,793	4,072,676	6,292,322
Dec.	3,604,731	4,562,175	3,299,786	2,246,742	1,477,529	977,389	2,047,780	2,239,126	3,511,702	5,056,843	1,685,273	3,751,253	5,958,893
Total	49,264,052	56,615,711	61,735,509	44,589,058	28,606,379	15,123,207	25,724,196	29,181,329	38,183,705	53,449,085	56,635,899	31,751,983	52,797,783

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952†
Jan.	5,764,723	6,926,085	7,112,106	7,424,522	7,592,603	7,204,312	3,872,887	7,222,512	7,480,878	8,197,390	7,941,797	8,848,466	9,136,117
Feb.	4,525,797	6,237,900	6,512,535	6,824,604	7,194,009	6,652,765	1,392,682	6,430,401	6,948,017	7,493,942	6,803,032	7,770,407	8,657,210
March	4,389,183	7,131,641	7,392,111	7,674,578	7,826,257	7,705,929	6,508,764	7,316,974	7,618,770	8,401,798	7,497,822	9,076,630	9,404,191
April	4,100,474	6,756,949	7,121,291	7,373,703	7,593,688	7,289,887	5,801,195	7,051,842	8,224,487	7,796,165	8,224,504	8,845,979	7,991,142
May	4,967,782	7,053,238	7,382,578	7,549,691	7,702,576	7,449,667	4,072,620	7,339,014	7,580,642	7,598,990	8,564,207	9,100,155	8,204,586
June	5,657,443	6,800,730	7,015,302	7,039,353	7,234,257	6,840,522	5,625,773	6,977,714	7,265,249	6,504,656	8,143,230	8,662,348	1,636,491
July	5,724,625	6,821,682	7,144,958	7,407,876	7,948,387	6,985,571	6,618,663	6,578,685	7,075,517	5,784,831	8,062,922	8,684,495	1,626,958
Aug.	6,186,383	7,000,957	7,227,655	7,586,464	7,498,913	5,735,317	6,924,522	6,991,152	7,446,834	6,722,771	8,242,174	8,739,095	8,498,687
Sept.	6,056,246	6,819,706	7,057,519	7,514,339	7,235,111	5,982,475	6,555,566	6,797,457	7,424,844	6,597,935	8,204,997	8,660,357	9,062,105
Oct.	6,644,542	7,242,683	7,579,514	7,814,117	7,620,885	5,596,776	6,951,742	7,570,152	7,996,895	928,347	8,752,686	9,121,888	9,806,830
Nov.	6,469,107	6,969,987	7,179,812	7,371,975	7,278,719	6,200,486	6,457,771	7,242,427	7,797,558	4,223,129	8,023,393	8,799,352	9,446,000
Dec.	6,495,357	7,163,999	7,304,540	7,255,144	7,336,170	6,057,937	5,760,501	7,375,641	7,780,779	7,728,224	8,355,311	8,890,678	9,662,800
Total	66,981,862	82,927,557	88,029,921	88,838,386	89,641,575	79,701,624	66,602,706	84,894,071	88,640,470	77,978,176	96,836,075	105,199,848	93,136,127

† Preliminary. * Estimate.

Source: American Iron & Steel Institute



PER CAPITA STEEL OUTPUT

Of the United States

Year	Pounds Per Person	Year	Pounds Per Person
1900	300	1926	921
1901	389	1927	846
1902	423	1928	958
1903	404	1929	1038
1904	367	1930	741
1905	535	1931	469
1906	613	1932	245
1907	602	1933	414
1908	354	1934	482
1909	593	1935	600
1910	633	1936	836
1911	565	1937	879
1912	734	1938	489
1913	712	1939	807
1914	531	1940	1015
1915	716	1941	1245
1916	940	1942	1278
1917	976	1943	1302
1918	953	1944	1298
1919	739	1945	1142
1920	886	1946	943
1921	408	1947	1179
1922	725	1948	1210
1923	899	1949	1045
1924	745	1950	1277
1925	878	1951	1366
		1952	1190*

* Estimated.

STEEL CAPACITY, PRODUCTION AND RATES

Ingots and Steel for Castings, Net Tons

	Total Capacity	Openhearth Production	Openhearth Percent of Total Output	Bessemer Production	Bessemer Percent of Total Output	Electric* Production	Electric* Percent of Total Output	Total Production	Total Percent of Capacity
1952†	108,587,670	82,801,363	88.9	3,520,404	3.8	6,814,360	7.3	93,136,127	85.8
1951	104,229,650	93,166,518	88.6	4,890,948	4.6	7,142,384	6.8	105,199,848	100.9
1950	**	86,262,509	89.1	4,534,558	4.7	6,039,008	6.2	96,836,075	96.9
1949	86,120,930	70,248,803	90.1	3,946,656	5.1	3,782,717	4.8	77,978,176	81.1
1948	84,243,460	79,340,157	89.5	4,243,172	4.8	5,057,141	5.7	88,640,470	94.1
1947	81,241,260	76,873,793	90.5	4,232,843	5.0	3,787,785	4.5	84,894,071	93.0
1946	91,890,880	60,711,963	91.2	3,327,737	5.0	2,563,024	3.8	66,602,724	72.5
1945	95,505,280	71,929,602	90.3	4,305,318	5.4	3,456,728	4.3	79,701,648	83.5
1944	93,854,420	80,363,953	89.7	5,039,923	5.6	4,237,724	4.7	89,641,600	95.5
1943	90,589,190	78,621,804	88.5	5,625,492	6.3	4,589,216	5.2	88,836,512	98.1
1942	88,886,550	78,501,957	88.9	5,553,424	6.5	3,976,550	4.6	86,031,931	96.8
1941	85,158,150	74,389,619	89.8	5,578,071	6.7	2,871,569	3.5	82,839,259	97.3
1940	81,619,498	61,573,083	91.9	3,708,573	5.6	1,701,030	2.5	66,982,686	82.1
1939	81,826,958	48,409,800	91.7	3,358,918	6.4	1,029,998	1.3	52,798,714	64.5
1938	80,158,638	29,080,016	91.6	2,106,340	6.6	565,634	1.8	31,751,990	39.6
1937	78,148,374	51,824,979	91.5	3,863,918	6.8	948,048	1.7	56,636,945	72.5
1936	78,164,300	48,760,463	91.2	3,873,472	7.2	866,064	1.6	53,499,999	68.4
1935	78,451,930	34,401,280	90.1	3,175,235	8.3	607,190	1.6	38,183,705	48.7
1934	78,128,416	26,354,838	90.3	2,421,840	8.3	405,246	1.4	29,181,924	37.4
1933	78,614,403	22,827,473	87.7	2,720,246	10.5	472,510	1.8	26,020,229	33.1
1932	78,780,913	13,338,210	87.0	1,715,925	11.2	270,766	1.8	15,322,901	19.5
1931	77,257,803	25,210,714	88.8	3,386,259	11.6	481,968	1.6	29,058,961	37.6
1930	72,985,406	39,255,073	88.1	5,639,714	12.4	688,634	1.5	45,583,421	62.5
1929	71,436,518	54,155,235	85.7	7,977,210	12.6	1,073,045	1.7	63,205,490	88.5
1928	68,840,912	49,407,631	85.6	7,414,618	12.8	907,232	1.6	57,729,481	83.9
1927	67,236,117	42,636,535	84.7	6,934,734	13.8	756,138	1.5	50,327,407	74.9
1926	67,750,035	45,575,016	84.2	7,786,716	14.4	747,282	1.4	54,089,014	83.6

* Includes very small tonnages of crucible steel.

** Jan. 1, 1950 to June 30, 1950 capacity was 99,392,800 net tons. Beginning July 1, 1950 capacity was revised to 100,563,500 net tons.

† Preliminary

Source: American Iron & Steel Institute

Operating rates by steelmaking processes
. . . Alloy and stainless steel ingot output
World Steel production by countries . . .

1 STEEL INDUSTRY

STEEL INDUSTRY OPERATING RATES

U. S. Openhearth, Bessemer and Electric Furnace Ingots and Steel for Castings—Percent of Capacity

	1932	1933	1936	1937	1938	1939		1940	1941	1942	1943	1944	1945		1946	1947	1948	1949	1950	1951	1952†
Jan.	25.88	17.76	52.46	61.32	29.14	52.59	Jan.	63.40	98.90	94.50	96.80	95.70	88.80	Jan.	49.60	93.20	93.60	100.4	94.0	99.9	99.3
Feb.	26.62	20.75	54.61	64.26	31.59	54.93	Feb.	70.00	98.60	95.90	98.50	97.00	90.80	Feb.	19.80	91.90	93.00	101.6	99.2	97.2	100.7
Mar.	24.96	15.68	57.54	69.93	33.67	56.52	Mar.	63.50	99.70	98.20	100.00	98.60	95.00	Mar.	53.30	94.40	95.30	102.9	88.8	102.5	102.2
Apr.	22.67	24.26	70.09	80.24	33.70	50.97	Apr.	61.20	97.60	97.70	99.30	98.80	92.80	Apr.	77.50	93.90	80.40	98.8	100.6	103.1	99.7
May	19.61	34.51	69.68	88.79	30.26	48.51	May	71.80	98.70	98.10	98.40	97.10	91.80	May	52.20	94.70	94.80	93.0	101.4	102.8	99.2
June	16.42	48.24	70.85	74.47	23.33	53.57	June	84.50	98.20	98.30	94.80	94.10	87.10	June	74.40	92.90	93.80	82.2	99.6	101.0	18.4
July	14.09	55.45	67.71	78.37	33.25	52.60	July	83.00	93.40	94.50	98.20	94.30	88.30	July	84.90	85.10	88.70	71.0	94.8	98.3	17.7
Aug.	14.76	50.00	72.22	83.71	42.63	62.45	Aug.	89.50	96.70	95.40	98.30	94.10	70.70	Aug.	86.90	92.20	93.10	82.3	98.5	98.7	92.4
Sept.	17.89	41.29	74.16	76.19	46.03	72.68	Sept.	90.60	98.40	96.40	100.70	94.00	76.30	Sept.	86.90	90.80	96.10	83.6	99.4	101.2	101.9
Oct.	18.94	36.40	78.26	53.23	52.19	89.52	Oct.	96.10	99.00	100.00	101.20	95.60	89.00	Oct.	89.00	97.70	99.90	11.4	102.4	103.0	106.6
Nov.	18.57	27.43	77.05	38.18	61.74	93.46	Nov.	98.60	98.30	97.80	98.60	94.30	78.90	Nov.	85.40	96.50	100.50	53.4	97.0	102.6	106.0
Dec.	15.04	31.48	76.53	25.34	52.72	85.91	Dec.	94.10	98.10	98.60	94.20	92.60	74.80	Dec.	73.90	95.40	97.7	94.8	98.0	100.6	104.6
Average	19.67	33.82	68.45	72.33	39.60	61.53	Average	82.10	97.40	96.80	98.10	95.50	83.50	Average	72.50	93.00	94.1	81.1	98.9	100.9	85.7

* Estimated. † Preliminary.

Source: American Iron & Steel Institute

ALLOY STEEL INGOT PRODUCTION

Other Than Stainless, by Grade, Net Tons

	1952(10 mos.)	1951	1950	1949	1948	1947	1946
Nickel	27,102	92,505	158,069	108,062	406,401	322,058	200,317
Molybdenum	296,965	436,787	636,012	475,691	653,823	592,462	426,521
Manganese	222,622	268,826	302,101	264,898	244,678	213,955	168,405
Manganese-Molybdenum	152,228	294,563	251,819	204,653	*	*	*
Chromium	1,085,385	1,484,578	1,183,107	768,917	1,001,738	880,101	655,885
Chromium-Vanadium	80,023	139,012	47,765	26,314	*	*	*
Nickel-Chromium	98,855	116,450	221,690	156,060	688,918	630,705	456,456
Chromium-Molybdenum	922,928	890,313	544,280	313,195	489,931	347,867	384,571
Nickel-Molybdenum	111,217	155,036	489,525	309,971	*	*	461,689
Nickel-Chromium-Molybdenum—NE Steels	1,299,684	2,206,461	1,289,771	797,941	1,164,200	878,353	680,804
Nickel-Chromium-Molybdenum—All Other	*	*	*	*	*	*	*
Silico-Manganese	78,899	116,543	137,084	177,831	233,167	221,386	204,661
All Other	1,939,963	2,840,381	2,372,517	1,738,718	2,877,964	2,711,891	1,793,347
Total	6,315,871	9,061,455	7,613,740	5,342,271	7,760,820	6,798,778	5,432,656

* Included in "All Other."

Source: American Iron and Steel Institute

WORLD STEEL PRODUCTION

Ingots and Steel for Castings, Thousands of Net Tons

Compiled by THE IRON AGE from the United Nations Bulletin of Statistics, Chambre Syndicate de la Siderurgie Francaise, British Iron and Steel Federation and the American Iron and Steel Institute.

	1952*	1951*	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941
Australia	1,680	1,606	1,596	1,309	1,425	1,373	1,164	1,505	1,703	1,822	1,901	1,835
Austria	1,180	1,133	1,044	920	713	394	207	189	....	....	....	....
Belgium	5,400	5,590	4,155	4,242	4,318	3,181	2,508	805	670	1,834	1,518	1,782
Brazil	920	930	834	671	545	426	379	227	243	205	176	170
Canada	3,790	3,567	3,384	3,186	3,159	2,902	2,293	2,803	2,930	2,872	2,986	2,623
Czechoslovakia	3,750	3,651*	3,190*	2,756*	2,910*	2,520	1,843	1,045	2,778	2,831	2,619	2,659
France	11,730	10,842	9,537	10,086	7,984	6,338	4,859	1,822	3,408	5,651	4,947	4,751
Germany Western	17,340	14,888	13,361[2]	10,090[2]	6,127[2]	4,739[2]	3,604[2]	5,500	24,481	33,706	31,684	25,804
Germany Eastern	2,160	1,711	....	....	....	....	....	....	....	....	....	....
Hungary	....	1,360*	1,100*	882*	794*	658	389	142	766	856	865	861
India	1,740	1,680	1,610	1,517	1,237	1,346	1,373	1,426	1,465	1,518	1,452	1,531
Italy	3,860	3,362	2,583	2,265	2,342	1,874	1,269	436	1,138	1,905	2,130	2,275
Japan	7,770	7,167	5,332	3,352	1,916	1,041	608	1,177	7,032	9,876	8,760	8,349
Luxembourg	3,320	3,391	2,702	2,507	2,705	1,888	1,426	291	1,389	2,368	1,720	1,376
Mexico	680	500	390	380	268	353	277	201	199	194	104	104
Netherlands	670	609	....	....	....	....	....	....	....	....	....	....
Poland	3,490	3,078	2,750*	2,539*	2,116*	1,731	1,344	548	755	870	....	....
Rumania	....	720*	....	....	....	....	....	....	....	....	....	....
Saar	3,070	2,869	2,092	1,936	1,922	780	317	....	....	....	....	....
South Africa	1,310	1,045	830	699	750	660	568	594	541	462	370	370
Spain	970	902	900	793	604	581	656	617	546	721	663	633
Sweden	1,750	1,658	1,587	1,511	1,270	1,311	1,335	1,327	1,320	1,338	1,354	1,275
United Kingdom	18,300	17,516	18,240	17,256	16,662	14,246	14,220	13,243	13,599	14,595	14,495	13,790
U.S.S.R.	38,575	34,500*	29,800*	23,500*	18,700*	14,700*	13,400*	12,300*	13,300	12,200	10,900	16,600
United States	93,258	105,200	96,836	77,978	88,894	84,894	66,603	79,702	89,642	88,837	86,032	82,839
Yugoslavia	480	470*	....	....	....	....	....	....	....	....	....	....
Totals†	228,550†	229,945†	204,348[1]	173,386*	167,107*	147,156*	120,345*	125,898*	171,905	184,461	174,676	169,627

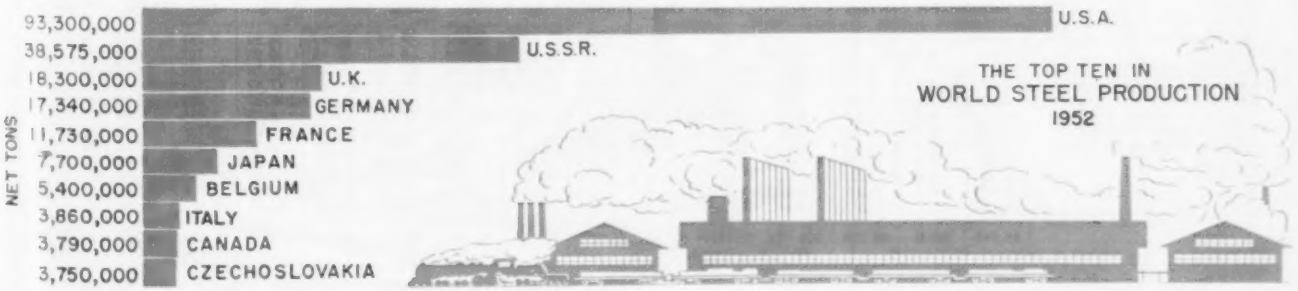
* Estimated. [1] Revised. [2] British, French and United States Zones.
† Includes misc. production not listed by countries.

STAINLESS STEEL

Ingot Production, Net Tons

Type	First 9 mos. 1952	1951	1950	1949	1948
301	7,169	20,794	61,425	34,150	61,566
302	48,232	99,324	169,444	94,956	145,426
302B	225	137	1,245	397	1,623
303	21,202	24,305	19,750	9,178	14,633
304	87,819	103,711	129,447	70,711	100,968
308	9,584	6,950	3,208	1,973	2,947
309	4,416	4,585	3,816	2,593	4,902
310	12,598	11,699	7,717	4,956	8,663
316	28,837	34,935	32,704	20,290	28,622
321	48,011	55,224	14,054	5,575	7,528
347	8,437	17,693	35,982	26,710	33,346
All Other	30,326	24,954	14,364	10,941	9,266
Total	305,126	404,311	493,156	282,070	416,387
403	18,867	17,833	7,204	5,613	6,423
405	2,586	3,984	2,843	2,179	4,126
406	1,401	3,566	2,101	1,622	2,560
410	27,413	46,605	29,369	16,172	25,614
414	1,371	3,127	4,584	2,021	5,562
416	24,510	36,045	27,480	9,348	16,264
420	3,551	5,606	7,360	3,260	4,852
430	188,552	360,503	221,301	122,353	122,437
430F	1,935	2,020	2,177	885	1,526
431	3,315	4,191	2,199	1,370	1,120
440A	1,125	1,155	1,854	1,359	1,433
440B	1,160	823	475	567	218
440C	2,173	3,832	1,782	960	1,220
442	1,238	945	404	298	318
443	176	9	8	....	33
446	1,881	4,105	3,192	2,808	2,573
All Other	4,358	4,506	6,437	2,408	4,692
Total	285,612	498,855	320,770	173,023	200,991
Total all types	608,541	915,751	832,309	455,093	617,378
Ratio stainless to total ingot output	1:056	1:115	1:116	1:171	1:143

Source: American Iron and Steel Institute.



1 STEEL INDUSTRY

Steel shipments and production for sale . . . Distribution by consuming industries: Agriculture, aircraft, automotive, etc.

SHIPMENTS AND PRODUCTION FOR SALE OF STEEL PRODUCTS

By Companies Who Made More Than 98 Pct of Total Rolled Steel Produced in the U. S.

Steel Products	1952—9 Months Shipments (N.T.)	Pct of Total	1951 Production for Sale (N.T.)	Pct of Total	1950 Shipments (N.T.)	Pct of Total	1949 Shipments (N.T.)	Pct of Total	1948 Shipments (N.T.)	Pct of Total	1947 Shipments (N.T.)	Pct of Total	1946 Shipments (N.T.)	Pct of Total
Ingots	718,368	1.5	1,315,846	1.7	888,324	1.2								
Blooms, slabs, billets, tube rounds, sheet bars	1,582,067	3.4	2,239,747	2.8	2,233,832	3.1	2,261,285	3.9	3,150,754	4.8	2,966,748	4.7	1,949,624	4.0
Skelp	72,431	0.2	152,474	0.2	123,388	0.2	118,533	0.2	75,252	0.1	160,989	0.3	227,033	0.5
Wire rods	497,494	1.1	847,369	1.1	816,555	1.1	570,397	1.0	610,348	0.9	667,282	1.1	679,993	1.4
Structural shapes (heavy)	2,887,890	6.1	4,921,970	6.2	4,197,653	5.8	3,669,503	6.3	4,255,355	6.5	4,436,129	7.0	3,474,284	7.1
Steel piling	160,727	0.3	399,073	0.5	342,277	0.5	301,824	0.5	299,537	0.5	324,224	0.5	205,313	0.4
Plates	5,043,356	10.7	7,910,594	10.0	5,677,094	7.9	5,759,065	9.9	7,000,199	10.6	6,345,216	10.1	4,152,181	8.5
Rails—Standard (over 60 lbs.)	919,832	1.9	1,699,042	2.2	1,705,243	2.4	1,772,734	3.0	1,976,520	3.0	2,207,146	3.5	1,790,311	3.7
Rails—All other	80,214	0.2	120,715	0.2	116,389	0.2	117,154	0.2	214,880	0.3	211,900	0.3	144,999	0.3
Joint bars	78,826	0.2	132,173	0.2	113,676	0.2	118,559	0.2	137,139	0.2	173,923	0.3		
Tie plates	264,756	0.6	445,932	0.6	416,258	0.6	373,337	0.6	489,434	0.8	504,779	0.8	624,299	1.3
Track spikes	70,295	0.1	158,406	0.2	138,732	0.2	95,345	0.2	145,830	0.2	163,746	0.3	146,194	0.3
Wheels (rolled or forged)	242,179	0.5	396,561	0.2	268,662	0.4	285,733	0.5	337,376	0.5	356,873	0.6	252,308	0.5
Axles	112,925	0.2	221,097	0.3	130,601	0.2	159,628	0.3	215,905	0.3	185,019	0.3	130,461	0.3
Hot rolled bars (including light shapes)	5,571,689	11.8	8,930,633	11.3	8,017,465	11.1	6,416,102	11.0	8,123,753	12.3	7,983,848	12.7	6,397,137	13.1
Hot rolled bars—Reinforcing	1,251,365	2.7	1,900,125	2.4	1,674,079	2.3	1,572,588	2.7	1,541,966	2.3	1,452,908	2.3	1,189,829	2.4
Cold finished bars	1,336,071	2.8	1,935,823	2.5	1,624,845	2.2	1,213,052	2.1	1,593,967	2.4	1,645,503	2.6	1,512,816	3.1
Tool steel bars	91,812	0.2	171,056	0.2	89,863	0.1	57,395	0.1	88,376	0.1	87,279	0.1	96,020	0.2
Standard pipe	1,675,893	3.5	2,933,321	3.7	2,599,818	3.6	2,090,445	3.6						
Oil country goods	1,116,367	2.4	1,879,216	2.4	1,692,821	2.3	1,365,982	2.3						
Line pipe	2,036,080	4.3	3,186,838	4.0	3,668,511	5.1	2,534,423	4.4	6,881,549	10.4	8,117,884	9.7	4,665,505	9.5
Mechanical tubing	662,360	1.4	980,066	1.2	743,892	1.0								
Pressure tubing	289,754	0.6	332,430	0.4	248,798	0.3	944,370	1.7						
Wire—Drawn	1,814,192	3.8	3,219,829	4.1	2,867,476	4.0	2,138,878	3.7	2,673,276	4.1	2,590,963	4.1	1,933,124	4.0
Wire—Nails and staples	478,032	1.0	864,833	1.1	874,470	1.2	731,356	1.3	859,540	1.3	799,436	1.3	636,632	1.3
Wire—Barbed and twisted	170,757	0.4	237,805	0.3	237,604	0.3	215,047	0.4	254,629	0.4	256,991	0.4	207,610	0.4
Wire—Woven wire fence	254,945	0.5	416,704	0.5	483,920	0.7	358,162	0.6	399,457	0.6	407,295	0.6	383,230	0.8
Wire—Bale ties	52,494	0.1	110,407	0.1	83,831	0.1	42,828	0.1	113,892	0.2	119,917	0.2	99,993	0.2
All other wire products														
Fence posts														
Black plate	637,864	1.4	1,076,296	1.4	562,077	0.8	452,041	0.8	838,666	1.3	820,997	1.3	906,337	1.9
Tin and terne plate—Hot dipped	969,743	2.1	1,628,562	2.1	1,911,568	2.7	1,699,355	2.9	2,167,912	3.3	2,093,149	3.3	1,924,657	3.9
Tin plate—Electrolytic	2,017,151	4.3	2,887,129	3.7	2,840,599	3.9	1,993,468	3.4	1,784,288	2.7	1,617,659	2.6	909,173	1.9
Sheets—Hot rolled	4,209,114	8.9	8,170,733	10.3	7,804,948	10.8	6,192,610	10.7	7,786,056	11.8	7,891,798	12.5	5,956,633	12.2
Sheets—Cold rolled	5,445,688	11.5	9,640,960	12.2	9,338,312	12.9	6,886,946	11.8	6,867,775	10.4	5,504,578	8.7	4,075,554	8.4
Sheets—Galvanized	1,338,372	2.8	1,964,961	2.5	2,262,041	3.1	1,755,067	3.0	1,643,337	2.5	1,609,881	2.5	1,462,053	3.0
Sheets—All other coated	149,475	0.3	257,195	0.3	237,941	0.3	151,118	0.3						
Sheets—Enameling	103,626	0.2	182,187	0.2	256,766	0.4	162,815	0.3						
Electrical sheets and strip	411,423	0.9	757,861	1.0	716,592	1.0	*379,180	0.6						
Strip—Hot rolled	1,240,149	2.6	2,206,978	2.8	2,330,783	3.2	1,674,818	2.9	1,662,787	2.5	1,740,085	2.7	1,363,812	2.8
Strip—Cold rolled	1,180,516	2.5	2,076,003	2.6	1,894,588	2.6	1,465,297	2.5	1,783,383	2.7	1,613,005	2.6	1,282,146	2.6
All other							7,570	0.0					6,266	0.0
Total steel products	47,236,562	100.0	78,928,950	100.0	72,232,292	100.0	58,104,010	100.0	65,973,138	100.0	63,057,150	100.0	48,775,532	100.0

* Electrical sheets only in 1949.

Source: American Iron and Steel Institute

STEEL DISTRIBUTION BY CONSUMING INDUSTRIES

In Thousands of Net Tons

	1945 Tons	Pct	1946 Tons	Pct	1947 Tons	Pct	1948 Tons	Pct	1949 † Tons	Pct	1950† Tons	Pct	1951* Tons	Pct	1952† Tons	Pct
Agriculture	2,426	4.3	2,100	4.3	2,422	3.84	2,743	4.16	2,644	4.55	3,094	4.28	3,281	4.16	2,881	4.19
Aircraft	5,521	9.7	32	0.06	44	0.07	39	0.06	44	0.08	56	0.08	167	.21	145	.21
Automotive			7,379	15.1	10,292	16.32	11,330	17.17	11,880	20.45	15,746	21.80	14,488	18.36	11,776	17.12
Construction and Maintenance	8,353	14.7	8,130	16.7	10,039	15.92	10,157	15.40	10,020	17.25	12,363	17.12	14,184	17.98	11,999	17.44
Containers	4,333	7.6	4,749	9.7	5,598	8.87	5,844	8.85	5,026	8.65	6,409	8.87	7,242	9.18	6,557	9.53
Machinery, Tools	4,739	8.3	4,438	9.1	5,648	8.96	5,337	8.09	4,274	7.36	5,812	8.05	7,033	8.92	6,296	9.15
Oil, Gas, Water, Mining	2,670	4.7	2,480	5.1	3,833	6.08	5,080	7.70	5,455	9.39	6,619	9.16	6,735	8.54	6,126	8.91
Pressing, Forming, Stamping	3,800	6.7	3,127	6.4	3,770	5.98	4,256	6.45	3,124	5.38	4,601	6.37	4,617	5.85	3,626	5.27
Railroads	5,268	9.3	4,764	9.8	5,999	9.51	5,866	8.89	4,038	6.95	4,796	6.64	6,558	8.32	4,664	6.78
Shipbuilding	3,374	5.9	320	.64	373	.59	716	1.09	722	1.24	355	.49	981	1.25	1,060	1.54
Exports	3,793	6.7	3,378	6.9	4,639	7.36	3,578	5.42	3,798	6.54	2,783	3.85	3,068	3.89	3,755	5.46
All Others	12,669	22.2	7,879	16.2	10,402	16.50	11,029	16.72	7,077	12.18	9,560	13.29	10,573	13.40	9,900	14.39
Total	56,946	100.0	48,776	100.00	63,057	100.00	65,973	100.00	58,104	100.00	72,233	100.00	78,929	100.00	68,797	100.00

* Revised. † Estimate.

IRON AGE compilation and distribution formula from data by American Iron and Steel Institute

Shipments of finished and semifinished stainless and alloy steel products . . . Canadian capacity, production, shipments

1 STEEL INDUSTRY

STAINLESS STEEL SHIPMENTS

Finished and Semifinished Products, Net Tons

PRODUCTS	1952–First 9 Months		1951		1950		1949	
	Shipments	Pct of Total	Shipments	Pct of Total	Shipments	Pct of Total	Shipments	Pct of Total
Ingots	13,384	3.9	19,321	3.6	16,904	3.8	16,292	6.1
Blooms, Billets, Slabs, etc.	12,767	3.8	18,367	3.3	10,405	2.3		
Plates	18,800	5.5	18,127	3.3	12,088	2.7	8,670	3.2
Sheets—Hot Rolled	18,910	5.6	39,585	7.5	27,426	6.1	15,515	5.8
Sheets—Cold Rolled	72,715	21.5	108,063	20.0	109,279	24.3	54,780	20.5
Strip—Hot Rolled	2,523	0.7	8,076	1.5	7,750	1.7	5,741	2.2
Strip—Cold Rolled	94,404	27.9	191,290	35.5	171,968	38.3	105,072	39.3
Bars—Hot Rolled	32,828	9.7	42,938	7.8	28,598	6.4	19,652	7.3
Bars—Cold Finished	34,533	10.2	41,732	7.7	30,848	6.9	17,928	6.7
Pipes and Tubes	13,531	4.0	16,457	3.1	11,308	2.5	7,336	2.7
Wire Rods	4,212	1.2	4,981	0.9	1,526	0.3	361	0.1
Wire Drawn	20,417	6.0	31,473	5.8	21,046	4.7	15,696	5.9
All Other (Incl. Shapes)	90	0.0	100	0.0	222	0.05	634	0.2
Total	339,114	100.0	539,510	100.0	449,380	100.0	267,677	100.0

Source: American Iron & Steel Institute

ALLOY STEEL SHIPMENTS

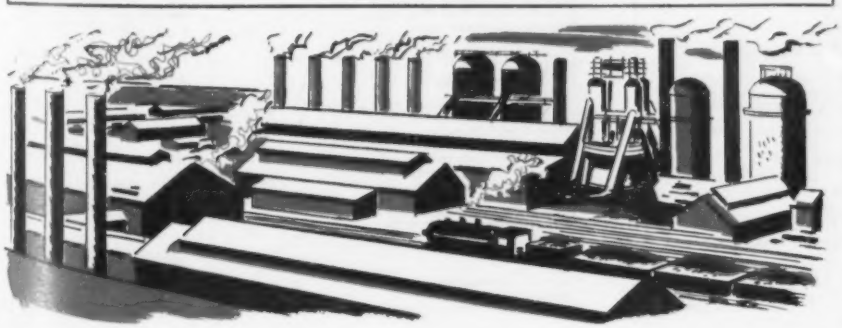
Except Stainless Steel and Types 501 and 502, Net Tons*

PRODUCTS	1952—First 9 Months			1951		1950		1949	
	Full Alloy Shipments	Hi-Str. Low Alloy Shipments	Pct of Total	Shipments	Pct of Total	Shipments	Pct of Total	Shipments	Pct of Total
Ingots	187,680		5.4	246,698	4.3	127,803	2.7		
Blooms, billets, slabs, tube rounds, etc.	371,123	2	10.6	575,897	10.1	445,731	9.4	374,150	10.9
Structural shapes (heavy)	9,881	40,917	1.4	63,219	1.1	51,126	1.1	40,606	1.2
Galvanized sheets			0.0	907	0.0	26,191	0.5		
Plates (sheared and universal)	130,173	118,102	7.1	393,219	7.0	204,669	4.3	153,220	4.5
Rails—standard (over 60 lbs)	146		0.0	162	0.0	359	0.0	120	0.0
Rails—all other	53		0.0	53	0.0	190	0.0	55	0.0
Bars—hot rolled	1,345,150	13,607	38.8	2,284,040	39.8	1,973,196	41.8	1,459,744	42.6
Bars—cold finished	231,540		6.6	337,195	5.9	260,037	5.5	173,420	5.1
Bars—tool steel	76,562		2.2	137,398	2.4	71,454	1.5	44,508	1.3
Oil Country, line pipe	105,440		3.0	192,671	3.4	222,412	4.7		
Mechanical tubing	191,288		5.5	298,896	5.2	211,810	4.5	353,248	10.3
Pressure tubing	27,151		0.8	27,009	0.5	35,355	0.5		
Electrical sheets and strip	354,435		10.1	623,337	10.9	606,060	12.8		
Wire rods	10,576		0.3	16,041	0.3	15,518	0.3	8,081	0.2
Wire drawn	38,553		1.1	51,699	0.9	38,431	0.8	26,286	0.8
Sheets—hot rolled	10,279	145,786	4.4	294,662	5.1	269,253	5.7	446,263	13.0
Sheets—cold rolled	1,656	53,767	1.6	111,846	2.0	111,059	2.4	223,210	6.5
Strip—hot rolled	12,571	11,160	0.7	38,176	0.6	45,987	1.0	54,354	1.6
Strip—cold rolled	12,686	1,983	0.4	28,658	0.5	18,661	0.4	66,840	1.9
Wheels (car, rolled steel)	660		0.0	178	0.0	166	0.0	93	0.0
Axles	365		0.0	685	0.0	612	0.0	550	0.0
All other	2	660	0.0	3,297	0.0	950	0.0	3,180	0.1
Total	3,117,780	385,744	100.0	5,725,943	100.0	4,725,332	100.0	3,427,928	100.0

* 1948-1949 data includes high-strength low-alloy steels.

Source: American Iron & Steel Institute

For steel used in automobile, appliances, etc., see Section 4. Steelmaking raw materials are in Section 3.



CANADIAN STEEL OUTPUT

Ingots and Steel for Castings, Net Tons

	Ingots	Castings	Total Steel Ingots and Castings
1924	700,196	28,576	728,772
1925	836,016	21,100	856,116
1926	877,917	37,338	915,255
1927	972,079	44,475	1,016,554
1928	1,332,801	50,058	1,382,859
1929	1,466,688	78,562	1,545,250
1930	1,072,321	60,830	1,133,151
1931	744,605	41,501	786,106
1932	349,843	25,664	375,507
1933	441,346	17,830	459,176
1934	827,041	23,116	850,157
1935	1,016,814	35,123	1,051,937
1936	1,211,334	38,337	1,249,671
1937	1,496,575	74,652	1,571,137
1938	1,238,078	56,636	1,294,714
1939	1,266,056	60,997	1,327,053
1940	2,177,973	77,899	2,255,872
1941	2,578,063	123,250	2,701,313
1942	2,942,921	178,440	3,121,361
1943	2,848,235	148,743	2,996,978
1944	2,878,407	146,003	3,024,410
1945	2,747,206	134,117	2,881,323
1946	2,253,437	81,194	2,334,631
1947	2,854,532	90,634	2,945,166
1948	3,089,027	112,629	3,201,656
1949	3,089,368	97,562	3,186,930
1950	3,298,068	86,063	3,381,131
1951	3,446,125	121,236	3,567,361
1952: Jan.	305,721	11,313	317,034
Feb.	294,346	11,519	305,865
Mar.	327,885	11,511	339,396
Apr.	304,956	11,685	316,641
May	318,890	11,634	330,524
June	294,006	11,449	305,455
July	.....	.....	.....
Aug.	.....	.....	.....
Sept.	.....	.....	.....
1952*	.....	.....	.....

* Estimated.

CANADIAN STEEL CAPACITY

Ingot Capacity and Operating Rates

	Steel Ingot Capacity	Steel Ingot Output	Percent of Capacity
1937	2,346,000	1,496,575	63.7
1938	2,346,000	1,238,078	52.7
1939	2,346,000	1,266,056	53.9
1940	2,667,000	2,177,973	81.6
1941	2,964,000	2,578,063	86.9
1942	3,172,000	2,942,921	92.7
1943	3,257,500	2,848,235	87.4
1944	3,338,200	2,878,407	86.2
1945	3,358,600	2,767,206	81.7
1946	3,358,600	2,253,437	67.0
1947	3,245,000	2,854,532	87.9
1948	3,490,000	3,089,027	88.5
1949	3,598,000	3,089,368	84.1
1950	3,672,500	3,298,068	89.8
1951	3,630,900	3,446,125	94.9
1952*	.....	.....	....

* December estimated.

CANADIAN FINISHED STEEL

Production and Shipments, Net Tons

	Production Carbon Steel Shapes	Shipments* Carbon Steel Shapes	Production Alloy Steel Shapes	Shipments* Alloy Steel Shapes
1946	2,300,088	2,298,986	75,442	73,180
1947	3,042,727	2,343,688	117,684	111,778
1948	3,421,669	2,475,577	153,595	147,323
1949	3,556,507	2,604,884	109,735	103,307
1950	4,117,163	2,703,692	137,859	129,180
1951	4,643,322	2,971,371	157,498	149,638
1952:				
Jan.	421,218	252,795	16,069	13,630
Feb.	402,950	247,650	12,788	14,164
Mar.	405,595	248,003	12,746	12,320
Apr.	406,441	256,115	14,364	12,864
May	420,941	261,405	13,219	12,728
June	395,666	248,352	14,669	15,333
July	.....	.....	.....	.....
Aug.	.....	.....	.....	.....
Total: 8 Mos.	0,000,000	0,000,000	000,000	000,000

* Excluding shipments to members of the industry for further conversion. Source of above three tables: Dominion Bureau of Statistics.

1 STEEL INDUSTRY

U. S. Coke Capacity: Oven types listed by producing companies, plant locations.

ANNUAL CAPACITIES OF COKE OVENS, BLAST FURNACES AND STEELMAKING FURNACES OF THE U. S.

The following five and a half pages list capacity data for steel companies of the United States by companies and by states. Coke ovens listed are those operated in connection with steelmaking. Data was compiled by and is presented with the permission of the American Iron and Steel Institute. These are official capacity figures as of Jan. 1, 1952. All capacity figures are reported in net tons.

U. S. COKE CAPACITY BY COMPANIES

Number and Capacity of Beehive and By-Product Coke Ovens

	BEEHIVE		OTHER		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Companies:					
Alan Wood Steel Company	.....	.....	151	600,000	600,000
Armco Steel Corporation	.....	.....	110	558,000	558,000
Sheffield Steel Corporation	.....	.....	47	270,000	270,000
TOTAL	.....	.....	157	828,000	828,000
Bethlehem Steel Company	.....	.....	1,916	9,546,000	9,546,000
Colorado Fuel and Iron Corporation	.....	.....	266	1,220,000	1,220,000
Crucible Steel Company of America	.....	.....	184	720,000	720,000
Detroit Steel Corporation	.....	.....	108	480,000	480,000
Donner-Hanna Coke Corporation	.....	.....	252	1,323,000	1,323,000
Eastern Gas and Fuel Associates	.....	.....	204	1,112,000	1,112,000
Ford Motor Company	.....	.....	183	1,314,000	1,314,000
Granite City Steel Co.	.....	.....	49	295,000	295,000
Inland Steel Company	.....	.....	418	2,143,400	2,143,400
Interlake Iron Corporation	.....	.....	333	1,333,400	1,333,400
International Harvester Company	.....	.....	133	600,000	600,000
Jones & Laughlin Steel Corporation	240	252,000	812	3,905,500	4,157,500
Kaiser Steel Corporation	297	100,000	135	566,000	666,000
Kaiser & Frazer Parts Corporation	500	300,000	.....	.....	300,000
Lone Star Steel Company	.....	.....	78	438,500	438,500
National Steel Corporation:					
Great Lakes Steel Corporation	.....	.....	146	1,120,000	1,120,000
Weirton Coal Company	136	120,000	.....	.....	120,000
Weirton Steel Company	.....	.....	249	1,510,000	1,510,000
TOTAL	136	120,000	395	2,630,000	2,750,000
Pittsburgh Coke & Chemical Company	.....	.....	105	685,000	685,000
Pittsburgh Steel Company	574	426,000	74	500,000	926,000
Republic Steel Corporation	296	215,000	1,023	5,245,000	5,460,000
Sharon Steel Corporation	.....	.....	60	225,000	225,000
Carpentertown Coal & Coke Co.	585	375,000	.....	.....	375,000
TOTAL	585	375,000	60	225,000	600,000
Sloss-Sheffield Steel & Iron Company	.....	.....	120	678,000	678,000
Tennessee Products & Chemical Corp.	.....	.....	44	240,000	240,000
United States Steel Corporation:					
United States Steel Company	2,912	2,073,750	2,995	14,369,820	16,443,570
American Steel & Wire Division			294	1,318,270	1,318,270
Columbia-Geneva Steel Division			308	1,212,300	1,212,300
National Tube Division			385	1,766,750	1,766,750
Tennessee Coal & Iron Division			572	2,945,550	2,945,550
TOTAL	2,912	2,073,750	4,554	21,612,690	23,686,440
Wheeling Steel Corporation	.....	.....	251	1,344,000	1,344,000
Woodward Iron Company	.....	.....	226	830,000	830,000
Youngstown Sheet and Tube Company	.....	.....	580	2,784,000	2,784,000
GRAND TOTAL	5,540	3,861,750	12,811	63,198,490	67,060,240

COKE CAPACITY BY STATES

Number and Capacity of Coke Ovens by Plant Location

Plant Location and Operating Company:					
Alabama					
Birmingham					
Republic Steel Corporation	.....	.....	57	250,000	250,000
Fairfield					
Tennessee Coal & Iron Division	.....	.....	572	2,945,550	2,945,550
Gadsden					
Republic Steel Corporation	.....	.....	102	565,000	565,000
North Birmingham					
Sloss-Sheffield Steel & Iron Company	.....	.....	120	678,000	678,000
Woodward					
Woodward Iron Company	.....	.....	226	830,000	830,000
TOTAL	.....	.....	1,077	5,268,550	5,268,550
California					
Fontana					
Kaiser Steel Corporation	.....	.....	135	566,000	566,000
Colorado					
Pueblo					
Colorado Fuel and Iron Corporation	.....	.....	266	1,220,000	1,220,000
Illinois					
Chicago					
Interlake Iron Corporation	.....	.....	120	396,200	396,200
Granite City					
Granite City Steel Company	.....	.....	49	295,000	295,000
Joliet					
United States Steel Company	.....	.....	280	1,071,520	1,071,520
South Chicago					
International Harvester Company	.....	.....	133	600,000	600,000
Republic Steel Corporation	.....	.....	75	460,000	460,000
Youngstown Sheet and Tube Co.	.....	.....	70	444,000	444,000
TOTAL	.....	.....	727	3,266,720	3,266,720
Indiana					
East Chicago					
Youngstown Sheet and Tube Co.	.....	.....	120	648,000	648,000
Gary					
United States Steel Company	.....	.....	1,148	5,855,100	5,855,100
Indiana Harbor					
Inland Steel Company	.....	.....	418	2,143,400	2,143,400
TOTAL	.....	.....	1,686	8,646,500	8,646,500
Maryland					
Sparrows Point					
Bethlehem Steel Company	.....	.....	551	2,928,000	2,928,000
Massachusetts					
Everett					
Eastern Gas and Fuel Associates	.....	.....	204	1,112,000	1,112,000
Michigan					
Dearborn					
Ford Motor Company	.....	.....	183	1,314,000	1,314,000
River Rouge					
Great Lakes Steel Corporation	.....	.....	146	1,120,000	1,120,000
TOTAL	.....	.....	329	2,434,000	2,434,000
Minnesota					
Duluth					
American Steel & Wire Division	.....	.....	114	483,600	483,600
Interlake Iron Corporation	.....	.....	61	314,000	314,000
TOTAL	.....	.....	175	797,600	797,600
New York					
Buffalo					
Donner-Hanna Coke Corporation	.....	.....	252	1,323,000	1,323,000
Lackawanna					
Bethlehem Steel Company	.....	.....	383	2,022,000	2,022,000
Troy					
Republic Steel Corporation	.....	.....	86	300,000	300,000
TOTAL	.....	.....	721	3,645,000	3,645,000
Ohio					
Campbell					
Youngstown Sheet and Tube Co.	.....	.....	306	1,320,000	1,320,000
Canton					
Republic Steel Corporation	.....	.....	62	240,000	240,000
Cleveland					
American Steel & Wire Division	.....	.....	180	834,670	834,670
Jones & Laughlin Steel Corporation	.....	.....	100	328,500	328,500
Republic Steel Corporation	.....	.....	279	1,345,000	1,345,000
Hamilton					
Armco Steel Corporation	.....	.....	110	558,000	558,000
Lorain					
National Tube Division	.....	.....	385	1,766,750	1,766,750
Massillon					
Republic Steel Corporation	.....	.....	49	215,000	215,000
Portsmouth					
Detroit Steel Corporation	.....	.....	108	480,000	480,000
Toledo					
Interlake Iron Corporation	.....	.....	94	372,600	372,600
Warren					
Republic Steel Corporation	.....	.....	141	870,000	870,000
Youngstown					
Republic Steel Corporation	.....	.....	172	1,000,000	1,000,000
Youngstown Sheet and Tube Co.	.....	.....	84	372,000	372,000
TOTAL	.....	.....	2,070	9,702,520	9,702,520
Pennsylvania					
Aliquippa					
Jones & Laughlin Steel Corporation	240	252,000	351	2,190,000	2,442,000

Coke capacity by states (continued) . . .
Blast furnaces, type, company, location.

COKE CAPACITY BY STATES (CONTINUED)

	BEEHIVE		OTHER		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Bethlehem Bethlehem Steel Company	.....	.....	416	1,680,000	1,680,000
Brownsville Junction Republic Steel Corporation	296	215,000	.....	.....	215,000
Clairton United States Steel Company	.....	.....	1,567	7,443,200	7,443,200
Erie Interlake Iron Corporation	.....	.....	58	250,600	250,600
Isabella Weirton Coal Company	136	120,000	.....	.....	120,000
Johnstown Bethlehem Steel Company	.....	.....	436	2,268,000	2,268,000
Midland Crucible Steel Company of America	.....	.....	184	720,000	720,000
Monessen Pittsburgh Steel Company	574	426,000	74	500,000	926,000
Mount Pleasant Carpentertown Coal & Coke Co.	585	375,000	.....	.....	375,000
Neville Island Pittsburgh Coke & Chemical Co.	.....	.....	105	685,000	685,000
Pittsburgh Jones & Laughlin Steel Corporation	.....	.....	360	1,387,000	1,387,000
Steelton Bethlehem Steel Company	.....	.....	130	648,000	648,000
Swedeland Alan Wood Steel Company	.....	.....	151	500,000	500,000
Various United States Steel Company	3,912	2,073,750	.....	.....	2,073,750
TOTAL	4,743	3,461,750	3,833	18,371,800	21,833,550
Tennessee					
Chattanooga Tennessee Products & Chemical Corp.	.....	.....	44	240,000	240,000
Texas					
Houston Sheffield Steel Corporation	.....	.....	47	270,000	270,000
Lone Star Lone Star Steel Company	.....	.....	78	438,500	438,500
TOTAL	.....	.....	125	708,500	708,500
Utah					
Dragerton Kaiser & Frazer Parts Corporation	500	300,000	.....	.....	300,000
Geneva Columbia-Geneva Steel Division	.....	.....	252	1,012,300	1,012,300
Ironton Columbia-Geneva Steel Division	.....	.....	56	200,000	200,000
Sunnyside Kaiser Steel Corporation	297	100,000	.....	.....	100,000
TOTAL	797	400,000	308	1,212,300	1,612,300
West Virginia					
East Steubenville Wheeling Steel Corporation	.....	.....	251	1,344,000	1,344,000
Fairmont Sharon Steel Corporation	.....	.....	60	225,000	225,000
Weirton Weirton Steel Company	.....	.....	249	1,510,000	1,510,000
TOTAL	.....	.....	560	3,079,000	3,079,000
GRAND TOTAL	5,540	3,861,750	12,811	63,198,490	67,060,240

U. S. BLAST FURNACE CAPACITY

Number, Type and Capacity of Furnaces by Companies

	PIG IRON		FERROALLOYS		Total annual capacity (N. T.)
	No. of stacks	Annual capacity (N. T.)	No. of stacks	Annual capacity (N. T.)	
Companies:					
Alan Wood Steel Company	2	454,800	...	.....	454,800
Allegheny Ludlum Steel Corporation	*1	*96,000	...	.....	*96,000
Armco Steel Corporation	5	1,341,000	...	.....	1,341,000
Sheffield Steel Corporation	1	300,000	...	.....	300,000
Valencia Iron & Chem. Corp.	1	27,000	...	.....	27,000
TOTAL	7	1,668,000	...	.....	1,668,000
Barium Steel Corporation: Chester Blast Furnace, Inc.	1	200,000	...	.....	200,000
Bethlehem Steel Company	29	10,220,000	2	180,000	10,400,000
Colorado Fuel and Iron Corporation	6	1,308,000	...	.....	1,308,000
E. & G. Brooke Iron Division	1	151,200	...	.....	151,200
TOTAL	7	1,459,200	...	.....	1,459,200
Crucible Steel Company of America	2	535,000	...	.....	535,000
Detroit Steel Corporation	1	284,800	...	.....	284,800
Eastern Gas and Fuel Associates	1	200,000	...	.....	200,000
Ford Motor Company	3	1,102,600	...	.....	1,102,600
Globe Iron Company	...	.....	1	100,000	100,000
Granite City Steel Co.	2	450,000	...	.....	450,000
Inland Steel Company	8	2,638,950	...	.....	2,638,950
Interlake Iron Corporation	6	1,298,270	...	.....	1,298,270
International Harvester Company	3	754,400	...	.....	754,400
Jackson Iron & Steel Company	...	.....	1	93,000	93,000
Jones & Laughlin Steel Corporation	13	4,212,000	...	.....	4,212,000
Kaiser Steel Corporation	2	876,000	...	.....	876,000
Lavino & Company, E. J.	...	.....	2	112,000	112,000
Lone Star Steel Company	1	366,600	...	.....	366,600
National Steel Corporation: Great Lakes Steel Corporation	3	1,200,000	...	.....	1,200,000
Hanna Furnace Corporation	3	680,000	1	120,000	800,000
Weirton Steel Company	3	1,500,000	...	.....	1,500,000
TOTAL	9	3,380,000	1	120,000	3,500,000
New Jersey Zinc Company	...	.....	2	112,000	112,000
Newport Steel Corporation	1	136,800	...	.....	136,800
Pittsburgh Coke & Chemical Company	2	462,500	...	.....	462,500
Pittsburgh Steel Company	3	954,000	...	.....	954,000
Republic Steel Corporation	21	6,705,000	...	.....	6,705,000
Sharon Steel Corporation	3	652,800	...	.....	652,800
Shenango Furnace Company	3	417,300	...	.....	417,300
Sloss-Sheffield Steel & Iron Company	4	491,710	...	.....	491,710
Tennessee Products & Chemical Corp.	3	210,180	...	.....	210,180
Tonawanda Iron Division	1	171,000	...	.....	171,000
United States Steel Corporation: United States Steel Company	49	17,532,500	4	335,400	17,867,900
American Steel & Wire Division	9	1,429,400	...	.....	1,429,400
Columbia-Geneva Steel Division	5	1,682,700	.....	.....	1,682,700
National Tube Division	9	3,122,800	...	.....	3,122,800
Tennessee Coal & Iron Division	9	2,468,500	(a)	29,000	2,497,500
TOTAL	78	26,235,900	4	364,400	26,600,300
Wheeling Steel Corporation	6	1,678,500	...	.....	1,678,500
Woodward Iron Company	4	772,630	...	.....	772,630
Youngstown Sheet & Tube Company	12	3,616,000	...	.....	3,616,000
GRAND TOTAL	238	72,700,940	13	1,081,400	73,782,340

BLAST FURNACE CAPACITY BY STATES

Number and Type of Blast Furnaces by Plant Location

	PIG IRON		FERROALLOYS		Total annual capacity (N. T.)
	No. of stacks	Annual capacity (N. T.)	No. of stacks	Annual capacity (N. T.)	
Plant Location and Operating Company:					
Alabama					
Birmingham Republic Steel Corporation	2	456,000	...	.....	456,000
Sloss-Sheffield Steel & Iron Company	2	281,230	...	.....	281,230
Ensley Tennessee Coal & Iron Division	6	1,452,800	(a)	29,000	1,481,800
Fairfield Tennessee Coal & Iron Division	3	1,015,700	...	.....	1,015,700
Gadsden Republic Steel Corporation	2	471,000	...	.....	471,000
North Birmingham Sloss-Sheffield Steel & Iron Company	2	210,480	...	.....	210,480
Woodward Woodward Iron Company	4	772,630	...	.....	772,630
TOTAL	21	4,659,840	(a)	29,000	4,688,840
California					
Fontana Kaiser Steel Corporation	2	876,000	...	.....	876,000
Colorado					
Pueblo Colorado Fuel and Iron Corporation	4	918,000	...	.....	918,000
Illinois					
Chicago Interlake Iron Corporation	2	448,020	...	.....	448,020
Granite City Granite City Steel Co.	2	450,000	...	.....	450,000
South Chicago International Harvester Company	3	754,400	...	.....	754,400
Republic Steel Corporation	1	450,000	...	.....	450,000
United States Steel Company	11	4,196,700	...	.....	4,196,700
Youngstown Sheet and Tube Company	3	684,000	...	.....	684,000
TOTAL	22	6,983,120	...	.....	6,983,120
Indiana					
East Chicago Youngstown Sheet and Tube Company	2	779,200	...	.....	779,200
Gary United States Steel Company	12	4,721,400	...	.....	4,721,400
Indiana Harbor Inland Steel Company	8	2,638,950	...	.....	2,638,950
TOTAL	22	8,139,550	...	.....	8,139,550
Kentucky					
Ashland Armco Steel Corporation	3	777,000	...	.....	777,000
Maryland					
Sparrows Point Bethlehem Steel Company	8	3,252,000	...	.....	3,252,000
Massachusetts					
Everett Eastern Gas and Fuel Associates	1	200,000	...	.....	200,000

STEEL CAPACITY BY STATES (CONTINUED)

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Youngstown Sheet and Tube Company	9	1,196,000	2	330,000	....	.....	1,526,000
Fort Wayne							
Joslyn Mfg. & Supply Company	....	.....	....	.....	3	37,500	37,500
Gary							
United States Steel Co.	55	6,264,400	(c) 3	.....	....	.....	6,264,400
Indiana Harbor							
Inland Steel Company	36	3,750,000	....	.....	....	.....	3,750,000
Kokomo							
Continental Steel Corp.	5	394,000	....	.....	....	.....	394,000
New Castle							
Borg-Warner Corp.	....	.....	....	.....	3	30,000	30,000
TOTAL	105	11,604,400	5	330,000	6	67,500	12,001,900
Kentucky							
Ashland							
Armco Steel Corporation	8	860,000	....	.....	....	.....	860,000
Newport							
Newport Steel Corp.	7	375,300	....	.....	3	333,200	708,500
TOTAL	15	1,235,300	....	.....	3	333,200	1,568,500
Maryland							
Baltimore							
Armco Steel Corporation	....	.....	....	.....	6	102,000	102,000
Colgate							
Eastern Stainless Steel Corp.	....	.....	....	.....	2	14,400	14,400
Sparrows Point							
Bethlehem Steel Co.	28	5,064,000	3	336,000	....	.....	5,400,000
TOTAL	28	5,064,000	3	336,000	8	116,400	5,516,400
Massachusetts							
Worcester							
American Steel & Wire Division	4	275,000	....	.....	....	.....	275,000
Michigan							
Dearborn							
Ford Motor Company	10	1,260,000	....	.....	17	261,280	1,521,280
Detroit							
Rotary Electric Steel Company	....	.....	....	.....	5	425,000	425,000
Ecorse							
Great Lakes Steel Corp.	17	2,600,000	(c) 2	.....	....	.....	2,600,000
Ferndale							
Allegheny Ludlum Steel Corporation	....	.....	....	.....	5	3,000	3,000
Trenton							
McLouth Steel Corp.	....	.....	....	.....	4	581,100	581,100
TOTAL	27	3,860,000	(c) 2	.....	31	1,270,380	5,130,380
Minnesota							
Duluth							
American Steel & Wire Division	9	918,000	....	.....	....	.....	918,000
Missouri							
Kansas City							
Sheffield Steel Corp.	5	480,000	....	.....	....	.....	480,000
New Jersey							
Harrison							
Crucible Steel Company of America	....	.....	....	.....	13	2,360	2,360
Roebling							
Roebling's Sons Co., J. A.	9	204,870	....	.....	....	.....	204,870
TOTAL	9	204,870	....	.....	13	2,360	207,230
New York							
Buffalo							
Republic Steel Corp.	9	882,000	....	.....	....	.....	882,000
Dunkirk							
Allegheny Ludlum Steel Corporation	....	.....	....	.....	3	33,000	33,000
Lackawanna							
Bethlehem Steel Co.	30	4,020,000	....	.....	....	.....	4,020,000
Lockport							
Simonds Saw & Steel Co.	....	.....	....	.....	3	21,600	21,600
Syracuse							
Crucible Steel Company of America	....	.....	....	.....	6	59,600	59,600
Tonawanda							
Allegheny Ludlum Steel Corporation	....	.....	....	.....	2	4,500	4,500
Colorado Fuel & Iron Corp.	4	240,000	....	.....	....	.....	240,000
Watervliet							
Allegheny Ludlum Steel Corporation	....	.....	....	.....	7	30,000	30,000
TOTAL	43	5,142,000	....	.....	21	148,700	5,290,700
Ohio							
Campbell							
Youngstown Sheet and Tube Company	12	1,422,000	2	240,000	....	.....	1,662,000
Canton							
Industrial Forge & Steel, Inc.	2	48,600	....	.....	....	.....	48,600
Republic Steel Corp.	6	450,000	....	.....	17	675,000	1,125,000
Timken Roller Bearing Co.	3	201,600	....	.....	6	345,600	547,200
Cleveland							
Jones & Laughlin Steel Corp.	11	1,155,000	....	.....	....	.....	1,155,000
Republic Steel Corp.	15	1,900,000	....	.....	....	.....	1,900,000
Lorain							
National Tube Div.	12	1,400,000	3	900,000	....	.....	2,300,000
Lowellville							
Sharon Steel Corp.	5	478,000	....	.....	2	72,000	550,000
Mansfield							
Empire Steel Corp.	6	409,300	....	.....	....	.....	409,300
Massillon							
Republic Steel Corp.	9	620,000	....	.....	....	.....	620,000
Middletown							
Armco Steel Corp.	11	1,277,000	....	.....	2	228,000	1,505,000
Portsmouth							
Detroit Steel Corp.	10	650,800	....	.....	....	.....	650,000
Steubenville							
Wheeling Steel Corp.	11	1,440,000	....	.....	....	.....	1,440,000
Toronto							
Ohio River Steel Div., Universal Laboratories	4	136,080	....	.....	....	.....	136,080
Warren							
Copperweld Steel Co.	....	.....	....	.....	7	618,380	618,380
Republic Steel Corp.	8	900,000	....	.....	....	.....	900,000
Youngstown							
Republic Steel Corp.	15	1,477,000	2	665,000	....	.....	2,142,000
United States Steel Co.	15	1,900,000	2	784,000	....	.....	2,684,000
Youngstown Sheet and Tube Co.	12	1,182,000	....	.....	....	.....	1,182,000
TOTAL	167	17,046,580	9	2,589,000	34	1,938,980	21,574,560
Oklahoma							
Oklahoma City							
(b) Hoster Steel Corp.	...	.....	....	.....	1	16,920	16,920
Sand Springs							
Sheffield Steel Corp.	1	54,000	....	.....	....	.....	54,000
TOTAL	1	54,000	....	.....	1	16,920	70,920
Oregon							
Portland							
Oregon Steel Mills	..	.....	....	.....	3	110,000	110,000
Pennsylvania							
Aliquippa							
Jones & Laughlin Steel Corp.	5	1,182,000	3	582,000	....	.....	1,764,000
Vulcan Crucible Steel Co.	....	.....	....	.....	2	9,800	9,800
Beaver Falls							
Babcock & Wilcox Co.	....	.....	....	.....	3	133,450	133,450
Bethlehem							
Bethlehem Steel Co.	32	2,970,000	....	.....	4	158,000	3,128,000
Brackenridge							
Allegheny Ludlum Steel Corp.	6	240,000	....	.....	15	506,700	746,700
Braddock							
United States Steel Co.	16	2,080,400	....	.....	....	.....	2,080,400
Braeburn							
Braeburn Alloy Steel Corp.	....	.....	....	.....	2	20,730	20,730
Bridgeville							
Universal-Cyclops Steel Corp.	...	.....	....	.....	5	70,160	70,160
Burnham							
Baldwin-Lima-Hamilton Corp.	5	169,920	....	.....	(a) 1	40	169,960
Butler							
Armco Steel Corporation	6	408,000	....	.....	1	66,000	474,000
Carnegie							
Union Electric Steel Corporation	....	.....	....	.....	2	26,760	26,760
Clairton							
United States Steel Co.	12	900,000	....	.....	....	.....	900,000
Coatesville							
Lukens Steel Company	12	675,000	....	.....	....	.....	675,000
Donora							
American Steel & Wire Division	13	900,000	....	.....	....	.....	900,000
Duquesne							
United States Steel Co.	27	1,900,000	....	.....	4	160,000	2,060,000
Erie							
Erie Forge Company	5	234,000	....	.....	....	.....	234,000
Farrell							
Sharon Steel Corp.	14	1,000,000	....	.....	....	.....	1,000,000
Greenville							
(b) Damascus Tube Co.	....	.....	....	.....	3	1,800	1,800
Harmony Township							
Byers Company, A. M.	....	.....	....	.....	2	75,000	75,000
Harrisburg							
Central Iron & Steel Co.	5	360,000	....	.....	1	46,000	406,000
Harrisburg Steel Corp.	3	100,750	....	.....	....	.....	100,750
Irvine							
National Forge & Ordnance Company	..	.....	....	.....	3	25,000	25,000
Ivy Rock							
Alan Wood Steel Co.	8	625,000	....	.....	....	.....	625,000
Johnstown							
Bethlehem Steel Co.	21	2,100,000	....	.....	....	.....	2,100,000
United States Steel Co.	3	18,900	....	.....	2	5,500	24,400
Latrobe							
American Locomotive Company	3	103,000	....	.....	....	.....	103,000
Latrobe Electric Steel Company	....	.....	....	.....	5	25,200	25,200

Steel capacity by states (concluded)...
Iron Age finished steel composite price
with a description of base and products

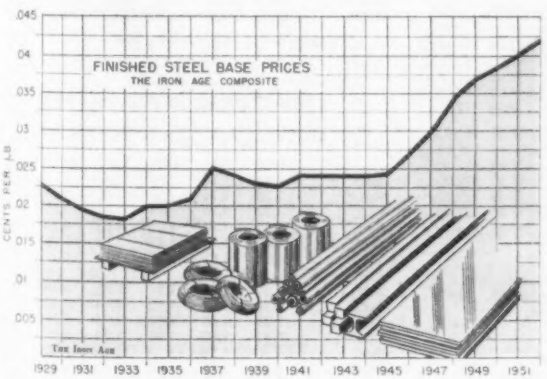
STEEL CAPACITY BY STATES (CONTINUED)

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Vanadium-Alloys Steel Company	....	.....	....	.....	3	11,910	11,910
McKeesport							
Firth Sterling Steel & Carbide Corp.	....	.....	....	.....	3	20,040	20,040
National Tube Div.	3	936,000	3	288,000	....	.....	1,224,000
Midland							
Crucible Steel Company of America	10	867,000	....	.....	5	270,000	1,137,000
Milton							
Boiardi Steel Corp.	....	.....	....	.....	2	53,700	53,700
Monaca							
Colonial Steel Co.	....	.....	....	.....	1	7,020	7,020
Monessen							
Pittsburgh Steel Co.	11	1,072,000	....	.....	....	.....	1,072,000
Munhall							
United States Steel Co.	45	4,366,000	....	.....	....	.....	4,366,000
Oakmont							
Edgewater Steel Co.	3	89,890	....	.....	....	.....	89,890
Philadelphia							
Disston & Sons, Inc., Henry	....	.....	....	.....	2	25,000	25,000
Midvale Company	3	135,620	....	.....	6	139,030	274,650
Phoenixville							
Phoenix Iron & Steel Co.	6	432,000	....	.....	....	.....	432,000
Pittsburgh							
Heppenstall Company	2	50,470	....	.....	1	5,080	55,550
Jones & Laughlin Steel Corporation	22	2,242,500	3	336,000	1	1,500	2,580,000
Reading							
Carpenter Steel Co.	....	.....	....	.....	7	85,800	85,800
Steelton							
Bethlehem Steel Co.	12	1,312,000	....	.....	....	.....	1,312,000
Vandergrift							
United States Steel Co.	12	550,000	....	.....	....	.....	550,000
Washington							
Jessop Steel Company	....	.....	....	.....	4	33,490	33,490
West Homestead							
Mesta Machine Co.	4	85,000	....	.....	1	20,000	105,000
TOTAL	329	28,105,450	9	1,206,000	(f) 91	2,002,510	31,313,960
Rhode Island							
Phillipsdale							
Washburn Wire Co.	4	93,000	....	.....	....	.....	93,000
Tennessee							
Knoxville							
Knoxville Iron Co.	....	.....	....	.....	2	38,000	38,000
Texas							
Fort Worth							
Texas Steel Company	....	.....	....	.....	2	22,320	22,320
Houston							
Sheffield Steel Corporation	8	900,000	....	.....	1	150,000	1,050,000
TOTAL	8	900,000	....	.....	3	172,320	1,072,320
Utah							
Geneva							
Columbia-Geneva Steel Div.	10	1,600,000	....	.....	....	.....	1,600,000
Virginia							
Newport News							
(b) Newport News Shipbuilding & Dry Dock Company	....	.....	....	.....	3	12,000	12,000
Washington							
Seattle							
Bethlehem Pacific Coast Steel Corp.	5	216,000	....	.....	....	.....	216,000
Isaacson Iron Works	....	.....	....	.....	2	102,000	102,000
Northwest Steel Rolling Mills, Inc.	....	.....	....	.....	1	32,400	32,400
(b) Seidelhuber Steel Rolling Mill Corp.	....	.....	....	.....	1	49,300	49,300
TOTAL	5	216,000	....	.....	4	183,700	399,700
West Virginia							
Benwood							
Wheeling Steel Corp.	....	.....	2	420,000	....	.....	420,000
Weirton							
Weirton Steel Co.	13	2,500,000	(c) 2	.....	....	.....	2,500,000
TOTAL	13	2,500,000	4	420,000	....	.....	2,920,000
GRAND TOTAL	941	94,973,780	(c) 38	5,381,000	(f)258	8,232,890	108,587,670

(a) Crucible furnace.
(b) Not described in the 1951 Directory.
(c) Used in melting charge for open hearth furnaces.
(d) Includes 3 converters used only in melting charge for open hearth furnaces.
(e) Includes 10 converters used only in melting charge for open hearth furnaces.
(f) Includes 1 crucible furnace, annual capacity, 40 tons.

THE IRON AGE FINISHED STEEL COMPOSITE PRICE

Current Series, 1930 to 1952, Cents Per Pound



	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
Jan.	2.229	1.991	1.852	1.830	1.958	2.065	2.076	2.323	2.584	2.354
Feb.	2.212	1.996	1.843	1.812	1.958	2.065	2.065	2.323	2.581	2.354
March	2.208	1.992	1.852	1.808	1.958	2.065	2.055	2.532	2.578	2.354
April	2.400	1.974	1.892	1.780	2.007	2.065	2.062	2.584	2.578	2.354
May	2.118	1.968	1.891	1.770	2.154	2.065	2.062	2.584	2.569	2.308
June	2.093	1.961	1.888	1.786	2.154	2.065	2.067	2.584	2.513	2.283
July	2.056	1.940	1.892	1.841	2.107	2.065	2.139	2.584	2.359	2.283
Aug.	2.031	1.943	1.889	1.851	2.065	2.065	2.139	2.584	2.359	2.283
Sept.	2.011	1.943	1.883	1.879	2.065	2.065	2.146	2.584	2.357	2.283
Oct.	2.001	1.942	1.873	1.955	2.065	2.076	2.172	2.584	2.320	2.283
Nov.	1.993	1.937	1.866	1.947	2.065	2.076	2.172	2.584	2.354	2.288
Dec.	1.975	1.902	1.861	1.958	2.065	2.076	2.263	2.584	2.354	2.305
Average	2.111	1.957	1.873	1.851	2.051	2.068	2.118	2.536	2.459	2.311

	1940		1945	1946	1947	1948	1949	1950	1951	1952
Jan.	2.305		2.412	2.464	2.877	3.193	3.720	3.837	4.131	4.131
Feb.	2.305		2.427	2.555	2.884	3.125	3.719	3.837	4.131	4.131
March	2.305		2.432	2.719	2.884	3.241	3.715	3.837	4.131	4.131
April	2.267		2.433	2.719	2.884	3.241	3.709	3.837	4.131	4.131
May	2.305	1941	2.436	2.719	2.884	3.214	3.706	3.837	4.131	4.131
June	2.305	1942	2.464	2.719	2.864	3.211	3.705	3.837	4.131	4.131
		1943								
July	2.305	1944	2.464	2.719	2.914	3.293	3.705	3.837	4.131	4.180
Aug.	2.305		2.464	2.719	3.193	3.720	3.705	3.837	4.131	4.376
Sept.	2.305		2.464	2.719	3.193	3.720	3.705	3.837	4.131	4.376
Oct.	2.305		2.464	2.719	3.193	3.720	3.705	3.837	4.131	4.376
Nov.	2.305		2.464	2.719	3.193	3.720	3.705	3.837	4.131	4.376
Dec.	2.305		2.464	2.747	3.193	3.720	2.756	4.131	4.131	4.376
Average	2.273	2.396	2.449	2.686	3.014	3.434	3.713	3.862	4.131	4.237

THE IRON AGE finished steel composite price is a weighted average of the base prices of 10 major steel products which account for the majority of finished steel shipments. It is weighted by the percentage that each of these products is to total finished steel shipments during the base period. With the base constant, the only changes in the composite from 1929 through 1940 or from 1941 through 1949 occur when one or more steel products prices were changed.

In the composite shown here there are two base periods. For the years 1929 through 1940 the base is finished steel shipments for 1929-1939 inclusive. For 1941 through 1950 the base is finished steel shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. Two base periods are used because of basic changes in the shipment pattern in the 20 years covered. In each case the products remain the same. They are hot-rolled bars, structural shapes, plates, rails, pipe, wire and hot-and cold-rolled sheets and strip. To eliminate variations due to nonferrous metals price fluctuations, no coated products are included.

Details of latest revisions which appear in current series may be found in The Iron Age, May 12, 1949, p. 139. This reference also gives a comparison of current series with former series.

STEEL INDUSTRY

Steel prices: Cold-finished bars, merchant bars, mfg. bright wire, pipe, tool steel, tinplate and structural steel shapes.

COLD-FINISHED STEEL BARS

At Pittsburgh, Cents Per Pound

	1936	1937	1938	1939*	1945*	1946
Jan.	2.10	2.55	2.90	2.70	2.65	2.75
Feb.	2.10	2.55	2.90	2.70	2.65	2.93
Mar.	2.10	2.83	2.90	2.70	2.65	3.10
Apr.	2.10	2.90	2.90	2.70	2.65	3.10
May	2.10	2.90	2.90	2.68	2.65	3.10
June	2.10	2.90	2.70	2.65	2.65	3.10
July	2.25	2.90	2.70	2.65	2.65	3.10
Aug.	2.25	2.90	2.70	2.65	2.73	3.10
Sept.	2.25	2.90	2.70	2.65	2.75	3.10
Oct.	2.35	2.90	2.70	2.65	2.75	3.10
Nov.	2.35	2.90	2.70	2.65	2.75	3.10
Dec.	2.35	2.90	2.70	2.65	2.75	3.10
Average	2.20	2.84	2.78	2.67	2.69	3.06

	1947	1948	1949	1950	1951	1952
Jan.	3.20	3.55	3.98	4.145	4.55	4.55
Feb.	3.20	3.55	3.98	4.145	4.55	4.55
Mar.	3.20	3.55	3.98	4.145	4.55	4.55
Apr.	3.20	3.55	3.98	4.145	4.55	4.55
May	3.20	3.50	3.98	4.145	4.55	4.55
June	3.20	3.50	3.98	4.145	4.55	4.55
July	3.27	3.82	3.98	4.145	4.55	4.625
Aug.	3.55	3.98	3.98	4.145	4.55	4.925
Sept.	3.55	3.98	3.98	4.145	4.55	4.925
Oct.	3.55	3.98	3.98	4.148	4.55	4.925
Nov.	3.55	3.98	3.98	4.15	4.55	4.925
Dec.	3.55	3.98	4.01	4.55	4.55	4.925
Average	3.35	3.74	3.98	4.179	4.55	4.712

* 1940-1944 = 2.65¢.

MERCHANT BARS

At Pittsburgh, Cents Per Pound

	1936	1937	1938	1939*	1945*	1946
Jan.	1.85	2.20	2.45	2.25	2.15	2.25
Feb.	1.85	2.20	2.45	2.25	2.15	2.38
Mar.	1.85	2.40	2.45	2.25	2.15	2.50
Apr.	1.85	2.45	2.45	2.25	2.15	2.50
May	1.85	2.45	2.45	2.19	2.17	2.50
June	1.85	2.45	2.41	2.15	2.25	2.50
July	1.95	2.45	2.25	2.15	2.25	2.50
Aug.	1.95	2.45	2.25	2.15	2.25	2.50
Sept.	1.95	2.45	2.25	2.15	2.25	2.50
Oct.	2.07	2.45	2.25	2.15	2.25	2.50
Nov.	2.05	2.45	2.25	2.15	2.25	2.50
Dec.	2.03	2.45	2.25	2.15	2.25	2.58
Average	1.95	2.40	2.35	2.19	2.21	2.47

	1947	1948	1949	1950	1951	1952
Jan.	2.60	2.90	3.45	3.45	3.70	3.70
Feb.	2.60	2.90	3.45	3.45	3.70	3.70
Mar.	2.60	2.90	3.43	3.45	3.70	3.70
Apr.	2.60	2.90	3.35	3.45	3.70	3.70
May	2.60	2.87	3.35	3.45	3.70	3.70
June	2.60	2.87	3.35	3.45	3.70	3.70
July	2.66	3.00	3.35	3.45	3.70	3.75
Aug.	2.90	3.45	3.35	3.45	3.70	3.95
Sept.	2.90	3.45	3.35	3.45	3.70	3.95
Oct.	2.90	3.45	3.35	3.45	3.70	3.95
Nov.	2.90	3.45	3.39	3.45	3.70	3.95
Dec.	2.90	3.45	3.38	3.70	3.70	3.95
Average	2.73	3.13	3.37	3.47	3.70	3.79

* 1940-1944 = 2.15¢.

MANUFACTURER'S BRIGHT WIRE

At Pittsburgh, Cents Per Pound

	1933	1934	1937	1938*	1945*	1946
Jan.	2.18	2.20	2.60	2.90	2.60	2.75
Feb.	2.10	2.20	2.60	2.90	2.60	2.90
Mar.	2.10	2.20	2.84	2.90	2.60	3.05
Apr.	2.10	2.23	2.90	2.90	2.60	3.05
May	2.10	2.30	2.90	2.90	2.63	3.05
June	2.10	2.30	2.90	2.84	2.75	3.05
July	2.10	2.30	2.90	2.60	2.75	3.05
Aug.	2.10	2.30	2.90	2.60	2.75	3.05
Sept.	2.10	2.30	2.90	2.60	2.75	3.05
Oct.	2.10	2.30	2.90	2.60	2.75	3.05
Nov.	2.10	2.30	2.90	2.60	2.75	3.05
Dec.	2.20	2.30	2.90	2.60	2.75	3.10
Average	2.11	2.27	2.84	2.74	2.69	3.02

	1947	1948	1949	1950	1951	1952
Jan.	3.30	3.55	4.33	4.50	4.85	4.85
Feb.	3.30	3.55	4.33	4.50	4.85	4.85
Mar.	3.30	3.55	4.22	4.50	4.85	4.85
Apr.	3.30	3.55	4.15	4.50	4.85	4.85
May	3.30	3.60	4.15	4.50	4.85	4.85
June	3.30	3.60	4.15	4.50	4.85	4.85
July	3.35	3.77	4.15	4.50	4.85	4.925
Aug.	3.55	4.33	4.15	4.50	4.85	5.225
Sept.	3.55	4.33	4.15	4.50	4.85	5.225
Oct.	3.55	4.33	4.15	4.50	4.85	5.225
Nov.	3.55	4.33	4.15	4.50	4.85	5.225
Dec.	3.55	4.33	4.29	4.85	4.85	5.225
Average	3.41	3.90	4.20	4.53	4.85	5.012

* 1939-1944 = 2.60¢.

CAST IRON WATER PIPE

At New York, Net Ton, 6-in. and Larger

	1933	1936	1936	1937	1938	1939*	1946*
Jan.	$35.20	$45.20	$48.00	$53.00	$49.00	$57.20	
Feb.	35.30	45.20	48.00	53.00	49.00	57.20	
Mar.	35.30	45.20	51.00	53.00	49.00	60.20	
Apr.	35.30	45.20	53.00	53.00	49.00	62.20	
May	35.30	45.20	53.00	53.00	49.00	62.20	
June	38.30	45.20	53.00	52.20	49.00	62.20	
July	38.30	45.90	53.00	49.00	49.00	69.60	
Aug.	38.30	45.90	53.00	49.00	49.00	69.60	
Sept.	38.30	45.90	53.00	49.00	49.00	69.60	
Oct.	38.00	45.90	53.00	49.00	52.20	69.60	
Nov.	43.00	45.90	53.00	49.00	52.20	69.60	
Dec.	43.00	47.90	53.00	49.00	52.20	73.60	
Average	37.81	45.71	52.00	50.93	49.80	65.23	

	1947	1948	1949	1950	1951	1952
Jan.	$73.60	$89.18	$105.95	$94.95	$103.00	$103.00
Feb.	73.75	89.18	105.95	92.35	103.00	103.00
Mar.	78.80	89.18	105.95	91.50	103.00	103.00
Apr.	79.80	89.18	103.98	91.50	103.00	103.00
May	79.80	92.34	94.95	91.50	103.00	103.00
June	79.80	95.50	94.95	91.50	103.00	103.00
July	80.50	95.50	94.95	91.50	103.00	103.00
Aug.	83.30	103.86	94.95	91.50	103.00	103.00
Sept.	83.30	105.95	94.95	91.50	103.00	111.50
Oct.	83.98	105.95	94.95	95.00	103.00	114.00
Nov.	84.18	105.95	94.95	95.00	103.00	114.00
Dec.	84.18	105.95	94.95	98.00	103.00	114.00
Average	80.25	97.31	98.45	92.98	108.67	110.46

* 1940-1945 = $52.20.

BUTWELD STEEL PIPE

At Pittsburgh, Per Net Ton, Carload Lots

	1933	1934	1936	1937	1938*	1946*
Jan.	$65.00	$61.75	$68.40	$61.00	$71.00	$63.00
Feb.	65.00	61.75	64.98	61.00	71.00	68.00
Mar.	65.00	61.75	61.80	69.00	71.00	69.00
Apr.	58.00	63.41	61.00	71.00	71.00	69.00
May	58.00	68.40	61.00	71.00	71.00	69.00
June	58.00	68.40	61.00	71.00	71.00	69.00
July	61.75	68.40	61.00	71.00	63.00	69.00
Aug.	61.75	68.40	61.00	71.00	63.00	69.00
Sept.	61.75	68.40	61.00	71.00	63.00	69.00
Oct.	61.75	68.40	61.00	71.00	63.00	69.00
Nov.	61.75	68.40	61.00	71.00	63.00	69.00
Dec.	61.75	68.40	61.00	71.00	63.00	71.00
Average	61.63	66.32	62.01	69.17	67.00	68.42

	1947	1948	1949	1950	1951	1952
Jan.	$79.00	$83.00	$103.00	$103.00	$117.00	$117.00
Feb.	79.00	91.50	103.00	103.00	117.00	117.00
Mar.	79.00	95.00	103.00	103.00	117.00	117.00
Apr.	79.00	95.00	103.00	103.00	117.00	117.00
May	79.00	94.00	103.00	103.00	117.00	117.00
June	79.00	93.00	103.00	103.00	117.00	117.00
July	79.00	95.00	103.00	103.00	117.00	118.00
Aug.	88.00	103.00	103.00	103.00	117.00	122.00
Sept.	83.00	103.00	103.00	103.00	117.00	122.00
Oct.	83.00	103.00	103.00	103.00	117.00	122.00
Nov.	83.00	103.00	103.00	103.00	117.00	122.00
Dec.	88.00	103.00	105.00	117.00	117.00	122.00
Average	82.75	97.21	103.17	103.75	117.00	119.17

* 1939-1945 = $83.00.

Computed from list discounts, for carload lots; price for base size pipe, 1 to 3 in.: 1 in. only since August, 1947; ¾ to 3 in. prior to Apr. 13, 1931.

HIGH SPEED TOOL STEEL

18-4-1, Cents Per Pound

	1947	1948	1949	1950	1951	1952
Jan.	72.494	82.0	90.5	100.0	116.8	150.5
Feb.	72.494	82.0	90.5	110.0	123.5	150.5
Mar.	72.494	82.0	90.5	100.0	123.5	150.5
Apr.	74.00	82.0	90.5	100.0	123.5	150.5
May	74.00	82.0	90.5	100.0	123.5	150.5
June	74.00	82.0	90.5	100.0	123.5	150.5
July	74.00	82.0	90.5	100.0	123.5	151.91
Aug.	82.00	90.5	90.5	100.0	150.5	157.57
Sept.	82.00	90.5	90.5	100.0	150.5	157.57
Oct.	82.00	90.5	90.5	100.0	150.5	157.57
Nov.	82.00	90.5	90.5	100.0	150.5	157.57
Dec.	82.00	90.5	90.5	110.0	150.5	157.57
Average	75.58	85.5	90.5	100.8	134.19	153.56

STRUCTURAL STEEL SHAPES

At Pittsburgh, Cents Per Pound

	1932	1934	1936	1937	1938*	1946*
Jan.	1.50	1.70	1.80	2.05	2.25	2.10
Feb.	1.50	1.70	1.80	2.05	2.25	2.23
Mar.	1.52	1.70	1.80	2.21	2.25	2.35
Apr.	1.60	1.74	1.80	2.25	2.25	2.35
May	1.60	1.85	1.80	2.25	2.25	2.35
June	1.60	1.85	1.90	2.25	2.22	2.35
July	1.60	1.81	1.90	2.25	2.10	2.35
Aug.	1.60	1.80	1.90	2.25	2.10	2.35
Sept.	1.60	1.80	1.90	2.25	2.10	2.35
Oct.	1.60	1.80	1.90	2.25	2.10	2.35
Nov.	1.60	1.80	1.90	2.25	2.10	2.35
Dec.	1.60	1.80	1.90	2.25	2.10	2.35
Average	1.57	1.78	1.85	2.21	2.17	2.32

	1947	1948	1949	1950	1951	1952
Jan.	2.50	2.80	3.25	3.40	3.65	3.65
Feb.	2.50	2.80	3.25	3.40	3.65	3.65
Mar.	2.50	2.80	3.25	3.40	3.65	3.65
Apr.	2.50	2.80	3.25	3.40	3.65	3.65
May	2.50	2.75	3.25	3.40	3.65	3.65
June	2.50	2.75	3.25	3.40	3.65	3.65
July	2.56	2.85	3.25	3.40	3.65	3.69
Aug.	2.80	3.25	3.25	3.40	3.65	3.85
Sept.	2.80	3.25	3.25	3.40	3.65	3.85
Oct.	2.80	3.25	3.25	3.40	3.65	3.85
Nov.	2.80	3.25	3.25	3.40	3.65	3.85
Dec.	2.80	3.25	3.31	3.65	3.65	3.85
Average	2.63	3.00	3.26	3.42	3.65	3.74

* 1939-1945 = 2.10¢.

TINPLATE AT PITTSBURGH

Dollars Per Base Box, 1.50-lb Coating

	1931	1933	1934	1936	1937	1939*
Jan.	$5.00	$4.25	$5.25	$5.25	$4.95	$5.35
Feb.	5.00	4.25	5.25	5.25	4.95	5.35
March	5.00	4.25	5.25	5.25	4.95	5.35
April	5.00	4.25	5.25	5.25	5.35	5.35
May	5.00	4.25	5.25	5.25	5.35	5.35
June	5.00	4.25	5.25	5.25	5.35	5.35
July	5.00	4.25	5.25	5.25	5.35	5.35
Aug.	5.00	4.29	5.25	5.25	5.35	5.35
Sept.	5.00	4.65	5.25	5.25	5.35	5.35
Oct.	4.75	4.65	5.25	5.25	5.35	5.35
Nov.	4.75	4.65	5.25	5.25	5.35	5.18
Dec.	4.75	5.25	5.25	5.25	5.35	5.00
Average	4.94	4.43	5.25	5.25	5.22	5.31

* 1939-1948 = $5.00.

	1947*	1948	1949	1950	1951	1952
Jan.	$5.75	$6.90	$7.75	$7.50	$8.70	$8.70
Feb.	5.75	6.90	7.75	7.50	8.70	8.70
March	5.75	6.90	7.75	7.50	8.70	8.70
April	5.75	6.90	7.75	7.50	8.70	8.70
May	5.75	6.70	7.75	7.50	8.70	8.70
June	5.75	6.70	7.75	7.50	8.70	8.70
July	5.75	6.72	7.75	7.50	8.70	8.75
Aug.	5.75	6.90	7.75	7.50	8.70	8.95
Sept.	5.75	6.90	7.75	7.50	8.70	8.95
Oct.	5.75	6.90	7.75	7.50	8.70	8.95
Nov.	5.75	6.90	7.75	7.50	8.70	8.95
Dec.	5.75	6.90	7.75	7.50	8.70	8.95
Average	5.75	6.77	7.75	7.50	8.67	8.81

Steel prices: Sheets (cold-rolled, galvanized, hot-rolled, stainless), hvy. rails, plates, hot-rolled and cold-rolled strip.

STEEL INDEX 1

COLD-ROLLED SHEETS

At Pittsburgh, Cents Per Pound

	1936	1937	1938	1939	1940*	1946*
Jan.	2.95	3.25	3.55	3.20	3.05	3.05
Feb.	2.95	3.25	3.50	3.20	3.05	3.16
Mar.	2.95	3.49	3.45	3.20	3.05	3.275
Apr.	2.95	3.55	3.45	3.20	2.93	3.275
May	2.95	3.55	3.43	3.11	3.05	3.275
June	2.95	3.55	3.32	3.05	3.05	3.275
July	3.05	3.55	3.20	3.05	3.05	3.275
Aug.	3.05	3.55	3.20	3.05	3.05	3.275
Sept.	3.05	3.55	3.20	3.05	3.05	3.275
Oct.	3.05	3.55	3.08	3.05	3.05	3.275
Nov.	3.05	3.55	3.20	3.05	3.05	3.275
Dec.	3.25	3.55	3.20	3.05	3.05	3.215
Average	3.02	3.49	3.31	3.10	3.04	3.242

	1947	1948	1949	1950	1951	1952
Jan.	3.20	3.55	4.00	4.10	4.35	4.35
Feb.	3.20	3.55	4.00	4.10	4.35	4.35
Mar.	3.20	3.55	4.00	4.10	4.35	4.35
Apr.	3.20	3.55	4.00	4.10	4.35	4.35
May	3.20	3.49	4.00	4.10	4.35	4.35
June	3.20	3.49	4.00	4.10	4.35	4.35
July	3.27	3.62	4.00	4.10	4.35	4.395
Aug.	3.55	4.00	4.00	4.10	4.35	4.575
Sept.	3.55	4.00	4.00	4.10	4.35	4.575
Oct.	3.55	4.00	4.00	4.10	4.35	4.575
Nov.	3.55	4.00	4.00	4.10	4.35	4.575
Dec.	3.55	4.00	4.04	4.35	4.35	4.575
Average	3.35	3.73	4.00	4.12	4.35	4.449

* 1941-1945 = 3.05¢.

COLD-ROLLED STRIP

At Pittsburgh, Cents Per Pound

	1936	1937	1938	1939	1940*	1946*
Jan.	2.80	2.85	3.20	2.95	2.80	2.80
Feb.	2.60	2.85	3.20	2.95	2.80	2.93
Mar.	2.60	3.13	3.20	2.95	2.80	3.05
Apr.	2.60	3.20	3.20	2.95	2.68	3.05
May	2.60	3.20	3.18	2.86	2.80	3.05
June	2.60	3.20	3.07	2.80	2.80	3.05
July	2.60	3.20	2.95	2.80	2.80	3.05
Aug.	2.60	3.20	2.95	2.80	2.80	3.05
Sept.	2.60	3.20	2.95	2.80	2.80	3.05
Oct.	2.60	3.20	2.83	2.80	2.80	3.05
Nov.	2.60	3.20	2.95	2.80	2.80	3.05
Dec.	2.60	3.20	2.95	2.80	2.80	3.17
Average	2.62	3.14	3.05	2.86	2.79	3.03

	1947	1948	1949	1950	1951	1952
Jan.	3.20	3.55	4.00	4.20	4.75	4.85
Feb.	3.20	3.55	4.00	4.21	4.75	4.85
Mar.	3.20	3.55	4.00	4.21	4.75	4.85
Apr.	3.20	3.55	4.00	4.21	4.75	4.85
May	3.20	3.53	4.00	4.21	4.75	4.85
June	3.20	3.53	4.00	4.21	4.75	4.85
July	3.27	3.85	4.00	4.21	4.75	4.74
Aug.	3.55	4.00	4.00	4.21	4.75	5.10
Sept.	3.55	4.00	4.00	4.21	4.75	5.10
Oct.	3.55	4.00	4.00	4.21	4.75	5.10
Nov.	3.55	4.00	4.00	4.21	4.75	5.10
Dec.	3.55	4.00	4.06	4.75	4.75	5.10
Average	3.35	3.76	4.01	4.25	4.75	4.845

* 1941-1945 = 2.80¢.

STAINLESS STEEL SHEETS

No. 304, Cents Per Pound

	1946*	1948	1949	1950	1951	1952
Jan.	38.00	39.00	41.25	39.50	43.00	43.25
Feb.	38.00	39.00	41.25	39.50	43.00	43.25
Mar.	38.00	39.00	41.25	39.50	43.00	43.25
Apr.	39.21	39.00	40.81	39.50	43.00	43.25
May	39.95	39.00	39.50	39.50	43.00	43.25
June	39.95	39.00	39.50	39.50	43.00	43.25
July	39.95	39.00	39.50	40.52	43.25	43.67
Aug.	39.95	40.80	39.50	41.00	43.25	45.28
Sept.	39.95	40.37	39.50	41.00	43.25	45.28
Oct.	39.95	40.81	39.50	41.00	43.25	45.28
Nov.	39.95	41.25	39.50	41.00	43.25	45.28
Dec.	39.95	41.25	39.50	43.00	43.25	45.28
Average	39.15	39.79	40.05	40.39	43.125	44.131

* 1939-1945 = 36.00¢.

HOT-ROLLED SHEETS

At Pittsburgh, Cents Per Pound

	1937	1938	1939	1940*	1945*	1946
Jan.	2.15	2.40	2.15	2.10	2.10	2.20
Feb.	2.15	2.40	2.15	2.10	2.10	2.31
Mar.	2.35	2.40	2.15	2.10	2.18	2.43
Apr.	2.40	2.40	2.15	2.10	2.20	2.43
May	2.40	2.38	2.06	1.98	2.20	2.43
June	2.40	2.27	2.00	2.10	2.20	2.43
July	2.40	2.15	2.00	2.10	2.20	2.43
Aug.	2.40	2.15	2.00	2.10	2.20	2.43
Sept.	2.40	2.15	2.00	2.10	2.20	2.43
Oct.	2.40	2.03	2.00	2.10	2.20	2.43
Nov.	2.40	2.15	2.02	2.10	2.20	2.43
Dec.	2.40	2.15	2.10	2.10	2.20	2.49
Average	2.35	2.25	2.06	2.09	2.18	2.40

	1947	1948	1949	1950	1951	1952
Jan.	2.50	2.80	3.28	3.35	3.60	3.60
Feb.	2.50	2.80	3.28	3.35	3.60	3.60
Mar.	2.50	2.80	3.28	3.35	3.60	3.60
Apr.	2.50	2.80	3.26	3.35	3.60	3.60
May	2.50	2.77	3.25	3.35	3.60	3.60
June	2.50	2.77	3.25	3.35	3.60	3.60
July	2.56	2.89	3.25	3.35	3.60	3.635
Aug.	2.80	3.28	3.25	3.35	3.60	3.775
Sept.	2.80	3.28	3.25	3.35	3.60	3.775
Oct.	2.80	3.28	3.25	3.35	3.60	3.775
Nov.	2.80	3.28	3.25	3.35	3.60	3.775
Dec.	2.80	3.28	3.29	3.60	3.60	3.775
Average	2.63	3.03	3.26	3.37	3.60	3.676

* 1941-1944 = 2.10¢.

HOT-ROLLED STRIP

At Pittsburgh, Cents Per Pound

	1936	1937	1938	1939	1940†	1946*
Jan.	1.85	2.15	2.40	2.15	2.10	2.10
Feb.	1.85	2.15	2.40	2.15	2.10	2.23
Mar.	1.85	2.35	2.40	2.15	2.10	2.35
Apr.	1.85	2.40	2.40	2.15	1.98	2.35
May	1.85	2.40	2.38	2.06	2.10	2.35
June	1.85	2.40	2.27	2.00	2.10	2.35
July	1.95	2.40	2.15	2.00	2.10	2.35
Aug.	1.95	2.40	2.15	2.00	2.10	2.35
Sept.	1.95	2.40	2.15	2.00	2.10	2.35
Oct.	1.95	2.40	2.03	2.00	2.10	2.35
Nov.	1.95	2.40	2.15	2.02	2.10	2.35
Dec.	2.11	2.40	2.15	2.10	2.10	2.47
Average	1.91	2.35	2.25	2.06	2.09	2.33

	1947	1948	1949	1950	1951	1952
Jan.	2.50	2.80	3.28	3.25	3.50	3.50
Feb.	2.50	2.80	3.28	3.25	3.50	3.50
Mar.	2.50	2.80	3.28	3.25	3.50	3.50
Apr.	2.50	2.80	3.28	3.25	3.50	3.50
May	2.50	2.80	3.25	3.25	3.50	3.50
June	2.50	2.80	3.25	3.25	3.50	3.50
July	2.58	2.90	3.25	3.25	3.50	3.545
Aug.	2.80	3.28	3.25	3.25	3.50	3.725
Sept.	2.80	3.28	3.25	3.25	3.50	3.725
Oct.	2.80	3.28	3.25	3.25	3.50	3.725
Nov.	2.80	3.28	3.25	3.25	3.50	3.725
Dec.	2.80	3.28	3.25	3.50	3.50	3.725
Average	2.63	3.03	3.26	3.27	3.50	3.606

* Over 6 in.; add 0.10¢ for 6 in. and under from February through November 1946.
† 1941-1945 = 2.10¢.

GALVANIZED SHEETS

At Pittsburgh, Cents Per Pound

	1934	1936	1937	1938	1945†	1946
Jan.	2.85	3.10	3.40	3.80	3.50	3.70
Feb.	2.85	3.10	3.40	3.80	3.50	3.88
Mar.	2.85	3.10	3.72	3.80	3.62	4.05
Apr.	2.95	3.10	3.80	3.80	3.65	4.05
May	3.25	3.10	3.80	3.80	3.66	4.05
June	3.25	3.10	3.80	3.68	3.70	4.05
July	3.13	3.20	3.80	3.50	3.70	4.05
Aug.	3.10	3.20	3.80	3.50	3.70	4.05
Sept.	3.10	3.20	3.80	3.50	3.70	4.05
Oct.	3.10	3.20	3.80	3.45	3.70	4.05
Nov.	3.10	3.20	3.80	3.50	3.70	4.05
Dec.	3.10	3.40	3.80	3.50	3.70	*3.65
Average	3.05	3.17	3.73	3.64	3.65	3.99

	1947	1948	1949	1950	1951	1952
Jan.	3.55	3.95	4.40	4.40	4.80	4.80
Feb.	3.55	3.95	4.40	4.40	4.80	4.80
Mar.	3.55	3.95	4.40	4.40	4.80	4.80
Apr.	3.55	3.95	4.40	4.40	4.80	4.80
May	3.56	3.91	4.40	4.40	4.80	4.80
June	3.55	3.91	4.40	4.40	4.80	4.80
July	3.63	4.03	4.40	4.40	4.80	4.855
Aug.	3.95	4.40	4.40	4.40	4.80	5.075
Sept.	3.95	4.40	4.40	4.40	4.80	5.075
Oct.	3.95	4.40	4.40	4.40	4.80	5.075
Nov.	3.95	4.40	4.40	4.40	4.80	5.075
Dec.	3.95	4.40	4.40	4.80	4.80	5.075
Average	3.72	4.13	4.40	4.43	4.80	4.919

* Based on 10 gage since December 1946; 24 gage base up to that time.
†1939-1944 = 3.50¢.

PLATES AT PITTSBURGH

Cents Per Pound, 1933 to 1952

	1933	1936	1937	1938*	1945*	1946
Jan.	1.60	1.80	2.05	2.25	2.10	2.25
Feb.	1.60	1.80	2.05	2.25	2.10	2.38
Mar.	1.60	1.80	2.21	2.25	2.20	2.50
Apr.	1.55	1.80	2.25	2.25	2.20	2.50
May	1.50	1.80	2.25	2.25	2.21	2.50
June	1.53	1.80	2.25	2.22	2.25	2.50
July	1.60	1.90	2.25	2.10	2.25	2.50
Aug.	1.60	1.90	2.25	2.10	2.25	2.50
Sept.	1.60	1.90	2.25	2.10	2.25	2.50
Oct.	1.70	1.90	2.25	2.10	2.25	2.50
Nov.	1.70	1.90	2.25	2.10	2.25	2.50
Dec.	1.70	1.90	2.25	2.10	2.25	2.50
Average	1.61	1.85	2.21	2.17	2.21	2.47

	1947	1948	1949	1950	1951	1952
Jan.	2.65	2.95	3.50	3.50	3.70	3.70
Feb.	2.65	2.95	3.50	3.50	3.70	3.70
Mar.	2.65	2.95	3.50	3.50	3.70	3.70
Apr.	2.65	2.95	3.50	3.50	3.70	3.70
May	2.65	2.93	3.40	3.50	3.70	3.70
June	2.71	2.93	3.40	3.50	3.70	3.70
July	2.95	3.07	3.40	3.50	3.70	3.74
Aug.	2.95	3.50	3.40	3.50	3.70	3.90
Sept.	2.95	3.50	3.40	3.50	3.70	3.90
Oct.	2.95	3.50	3.40	3.50	3.70	3.90
Nov.	2.95	3.50	3.40	3.50	3.70	3.90
Dec.	2.95	3.50	3.44	3.70	3.70	3.90
Average	2.80	3.19	3.43	3.52	3.70	3.777

* 1939-1944 = 2.10¢.

STEEL RAILS AT PITTSBURGH, No. 1 OH

Including Prices by Months and Yearly Averages in Dollars Per 100 lb*

	1934	1936	1937	1938†	1945†	1946
Jan.	$36.37	$36.37	$39.00	$42.50	$40.00	$43.00
Feb.	36.37	36.37	39.00	42.50	40.00	*43.19
Mar.	36.37	36.37	41.80	42.50	42.25	43.39
Apr.	36.37	36.37	42.50	42.50	43.00	43.39
May	36.37	36.37	42.50	42.50	43.00	43.39
June	36.37	36.37	42.50	42.50	43.00	43.39
July	36.37	36.37	42.50	42.50	43.00	43.39
Aug.	36.37	36.37	42.50	42.50	43.00	43.39
Sept.	36.37	36.37	42.50	41.25	43.00	43.39
Oct.	36.37	36.37	42.50	40.00	43.00	43.39
Nov.	36.37	36.37	42.50	40.00	43.00	43.39
Dec.	36.37	36.00	42.50	40.00	43.00	47.38
Average	36.37	36.59	41.86	41.77	42.44	43.67

	1947	1948	1949	1950	1951	1952
Jan.	$2.50	$2.75	$3.20	$3.40	$3.60	$3.60
Feb.	2.50	2.75	3.20	3.40	3.60	3.60
Mar.	2.50	2.75	3.20	3.40	3.60	3.60
Apr.	2.50	2.75	3.20	3.40	3.60	3.60
May	2.50	2.70	3.20	3.40	3.60	3.60
June	2.50	2.70	3.20	3.40	3.60	3.60
July	2.50	2.80	3.20	3.40	3.60	3.635
Aug.	2.75	3.20	3.20	3.40	3.60	3.775
Sept.	2.75	3.20	3.20	3.40	3.60	3.775
Oct.	2.75	3.20	3.20	3.40	3.60	3.775
Nov.	2.75	3.20	3.20	3.40	3.60	3.775
Dec.	2.75	3.20	3.28	3.60	3.60	3.775
Average	2.60	2.93	3.21	3.42	3.60	3.676

* Prices quoted dollars per gross ton prior to Feb. 15, 1948. Net tons, Feb. 15 to Dec. 13, 1946.
† 1939-1944 = $40.00 per gross ton.

1 STEEL INDUSTRY

Steel shipments to warehouses: Bars, wire, sheets, strip, plates, shapes, tubing . . . Total shipments with per cent of total.

STEEL SHIPMENTS TO WAREHOUSES

Net tons

HOT ROLLED STRIP

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	120,343	1,240,149	9.7
1951	179,836	2,206,978	8.1
1950	131,336	2,330,783	5.7
1949	125,079	1,628,917	7.7
1948	142,873	1,568,540	9.1
1947	129,352	1,740,085	7.4

COLD-ROLLED STRIP

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	61,194	1,180,516	5.2
1951	115,801	2,076,003	5.6
1950	107,579	1,894,586	5.7
1949	83,534	1,380,477	6.1
1948	91,343	1,519,753	6.0
1947	47,349	1,499,121	3.2

GALVANIZED SHEETS*

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	554,017	1,338,372	41.4
1951	731,677	1,984,961	36.9
1950	878,798	2,262,041	38.8
1949	623,897	1,755,087	35.6
1948	481,266	1,643,337	29.3
1947	440,021	1,609,881	27.3
1946	440,457	1,462,053	30.1
1945	647,748	1,695,798	38.2
1944	537,020	1,370,175	39.2
1943	316,674	869,109	36.7
1942	283,196	998,584	28.4
1941	676,835	1,708,050	39.6
1940	733,848	1,586,723	46.2

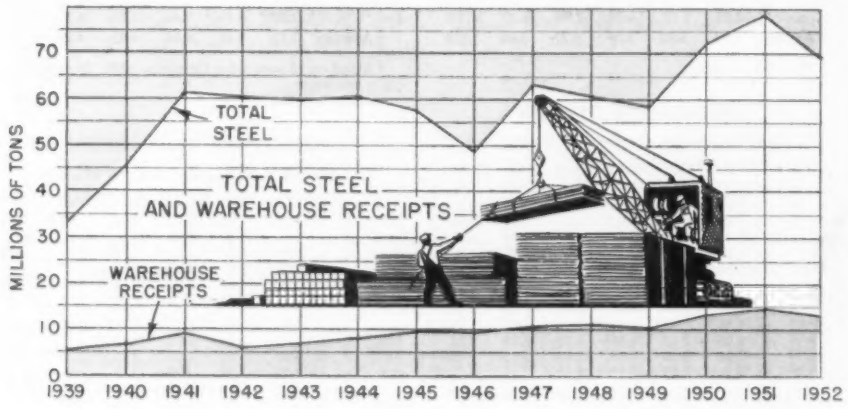
* 1946-47 includes coated sheets except tinplate and terneplate.

HOT-ROLLED SHEETS

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	590,779	4,209,114	14.0
1951	1,078,624	8,170,733	13.2
1950	958,910	7,804,948	12.3
1949	673,680	6,211,458	10.9
1948	824,023	6,704,654	12.3
1947	871,393	7,300,681	11.9

COLD-ROLLED SHEETS

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	691,960	5,445,688	12.7
1951	963,176	9,640,960	10.0
1950	902,156	9,338,312	9.7
1949	590,779	6,942,201	8.5
1948	516,273	6,361,378	8.1
1947	459,335	5,504,578	8.3



TOTAL STEEL PRODUCTS

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952*	9,200,127	47,236,562	19.48
1951	14,245,392	78,928,950	18.05
1950	13,171,880	72,232,292	18.2
1949	10,219,983	58,104,010	17.59
1948	10,949,920	60,968,999	17.96
1947	10,484,144	63,057,150	16.63
1946	9,304,817	49,775,532	18.69
1945	9,571,436	57,242,249	16.72
1944	8,008,076	60,352,690	13.27
1943	6,823,760	59,905,646	11.39
1942	5,962,068	60,484,774	9.86
1941	9,155,189	61,229,873	14.96
1940	6,686,534	45,850,825	14.58
1939	5,179,660	33,122,628	15.63

*9 Months.

PLATES

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	839,999	5,043,356	16.7
1951	1,088,063	7,910,594	13.8
1950	885,899	5,677,094	15.6
1949	661,348	5,759,065	11.5
1948	822,149	6,762,678	12.2
1947	922,459	6,345,216	14.5
1946	709,728	4,152,181	17.1
1945	745,663	6,841,304	10.9
1944	778,498	11,955,559	6.5
1943	565,862	12,937,230	4.4
1942	456,582	11,612,987	3.9
1941	438,540	5,842,809	7.5
1940	313,663	4,065,383	7.7

HOT-ROLLED BARS

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	912,556	5,571,689	16.4
1951	1,233,134	8,930,633	13.8
1950	1,101,249	8,017,465	13.7
1949	988,695	6,416,102	15.4
1948	1,100,931	6,196,444	17.8
1947	1,219,939	7,983,848	15.3
1946	1,026,873	6,397,137	16.1
1945	1,114,462	5,727,367	19.5
1944	915,527	6,020,464	15.2
1943	923,598	5,982,873	15.4
1942	684,881	5,519,035	12.4
1941	750,821	5,788,821	13.0

PIPE AND TUBING

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	2,602,450	5,780,454	45.0
1951	4,326,217	9,311,871	46.5
1950	4,078,140	8,923,840	45.7
1949	3,266,231	6,935,220	47.1
1948	3,302,127	6,456,102	51.1
1947	2,825,666	6,117,884	46.2
1946	2,601,500	4,655,505	55.9
1945	2,243,123	5,752,752	39.0
1944	2,054,560	5,259,503	39.1
1943	1,647,543	5,116,671	32.2
1942	1,633,738	4,716,061	34.6
1941	2,692,424	5,888,939	45.7
1940	2,142,147	3,920,200	54.6

WIRE AND WIRE PRODUCTS

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	1,029,347	2,770,420	37.2
1951	1,705,453	4,849,578	35.2
1950	1,686,610	4,547,301	37.1
1949	1,297,742	3,486,271	37.2
1948	1,559,676	4,300,794	36.3
1947	1,366,090	4,174,602	32.7
1946	1,151,316	3,260,589	35.3
1945	1,248,596	3,228,716	38.7
1944	1,262,525	3,200,852	39.4
1943	1,306,300	3,276,674	39.9
1942	935,104	3,314,361	28.2
1941	1,536,347	3,794,536	40.5
1940	1,054,843	2,569,337	41.1

STRUCTURAL SHAPES*

	Shipments to Warehouses	Total Mill Shipments	Percent of Total
1952 (9 mos.)	632,737	2,887,890	21.9
1951	909,592	4,921,970	18.5
1950	789,600	4,197,653	18.8
1949	679,719	3,669,503	18.5
1948	772,815	4,190,934	18.4
1947	857,082	4,436,129	19.3
1946	786,651	3,474,284	22.6
1945	917,142	3,763,952	24.4
1944	571,884	3,912,951	14.6
1943	412,727	3,918,126	10.5
1942	410,708	5,290,162	7.8
1941	547,511	4,941,818	11.1
1940	331,523	3,333,450	9.9

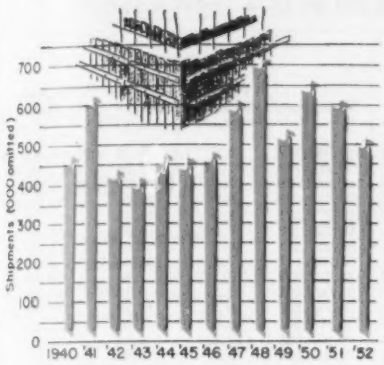
* 1940-45 includes piling.

Source for all tables on this page is American Iron and Steel Institute, compilation by THE IRON AGE

Steel Expansion: Blast furnaces, rolling mills openhearth and electric furnaces installed during 1952 . . . Rerolled rail shipments.

1 STEEL INDUSTRY

REROLLED RAIL STEEL SHIPMENTS
NET TONS



REROLLED RAIL STEEL

(Shipments—Net Tons)

Year	Concrete Bars	Carbon Bars	Other Products	Total
1947	236,322	263,066	90,085	589,473
1948	248,768	308,661	145,649	703,079
1949	223,325	234,877	71,013	529,215
1950	217,153	322,938	104,758	643,849
1951	219,150	313,061	74,505	606,716
1952*	186,785	269,353	49,808	505,946

* Includes estimate on last 2 months.
Source: Rail Steel Bar Assn.

NEW BLAST FURNACES

Completed or Enlarged During 1952

Company	No. of Furnaces	Annual Capacity Increase (N. T.)
Colorado Fuel & Iron Corp.	1	45,000[1]
Crucible Steel Co. of America	1	360,000
Jones & Laughlin Steel Corp.	1	200,000[2]
National Steel Corp.	1	560,000
	1	560,000
Republic Steel Corp.	1	560,000
U. S. Steel Corp.	1	600,000
Youngstown Sheet & Tube Co.	1	580,000[3]

[1] Modernization. [2] Rebuilt. [3] Due early in 1953.

NEW STEELMAKING CAPACITY—INSTALLED IN 1952

Openhearth and Electric with description and location of facilities

Company	No of Furnaces	Rated Capacity per Heat (N T)	Annual Capacity Increase (N T)	Location	Furnace Builder	Operation Started
OPENHEARTH FURNACE						
Bethelehem Steel	.....	.....	800,000	.....	.....	.....
Colorado Fuel & Iron	.....	.....	165,000	Pueblo, Colo.	Self	Oct.-Dec.
	.....	.....	26,570	Claymont, Del.	Self	.....
Crucible Steel	8	165	105,000[1]	Midland, Pa.	Self	Oct. Dec.
Inland Steel	4	250	750,000	Indiana Harbor, Ind.	McKee	Sept.-Dec.
Jones & Laughlin	.....	250	757,500	Pittsburgh	Loftus	Jan.-Apr.
	.....	210	150,000	Cleveland	Loftus	April
Laclede Steel	.....	.....	12,155[2]	Alton, Ill.	Self	.....
Lone Star Steel	4	200	550,000	Lone Star, Tex.	Rust	Dec. 31
Midvale Co.	1	100	49,291	Philadelphia	McKee	March
Pittsburgh Steel	3	250	163,000[3]	Monessen, Pa.	Self	Nov.-Dec.
Republic Steel	4	275	672,000	Cleveland	Freyn	.....
	.....	.....	121,000[5]	.....	.....	.....
U. S. Steel	3	275	600,000[6]	Morrisville, Pa.	.....	.....
	2	210	300,000[4]	Fairfield, Ala.	.....	.....
	1	225	160,000	Provo, Utah	.....	.....
Youngstown Sheet & Tube	8	250	330,000 tons retired. Net gain 880,000.	Indiana	.....	.....
TOTAL OPENHEARTH CAPACITY—6,109,017						
ELECTRIC FURNACES						
Allegheny Ludlum	3	2-10 1-10	72,000	Watervliet, N. Y.	Freyn	.....
Armco Steel	1	100	150,000	Kansas City	Pgh. Lectromelt	May
Atlantic Steel	1	60	100,000	Atlanta	Pgh. Lectromelt	May
Babcock & Wilcox	1	60	96,000	Beaver Falls, Pa.	Swindell Dressler	Oct.
Connors Steel Co.	1	.....	18,000	Birmingham	.....	.....
Eastern Stainless	1	20	12,000	Baltimore	American Bridge	Sept.
Ingersoll Steel Div.	2	12	48,200	New Castle, Ind.	American Bridge	.....
Le Tourneau Co.	3	25	120,000[4]	Longview, Tex.	.....	.....
Northwestern Steel & Wire	2	120	504,000	Sterling, Ill.	Pgh. Lectromelt	May-Aug.
Timken	3	80	Capacity 275,000 Replaced 3 openhearths. Net gain 75,000.	Canton, Ohio	American Bridge	Sept.-Dec.
Vanadium-Alloys	1	12.5	15,000	Monaca, Pa.	American Bridge	Dec.
TOTAL ELECTRIC CAPACITY—1,205,200						
TOTAL NEW STEELMAKING CAPACITY—7,284,217						

[1] Furnaces enlarged.
[2] Technological changes.
[3] Furnaces enlarged.
[4] Estimated.
[5] Includes electric furnace and openhearth reconstruction and technological changes.
[6] 1.2 million tons more due in early1953.

STEEL ROLLING MILL INSTALLATIONS

Built or Modernized During 1952—As Reported to The Iron Age

Company	Location of Works	Builder	New or Modernized	Type
Allegheny Ludlum Steel Corp.	Brackenridge, Pa.	Mesta	New	56" hot strip mill
Armco Steel Corp.	Ashland, Ky.	United	Modernized	45" x 100" 2-H rev. slab mill & 80" hot strip m
Bethlehem Steel Co.	Johnstown, Pa.	Morgan Constr.	Modernized	Cont. billet mill
	Johnstown, Pa.	Mesta	Modernized	30" 2-H Cont. billet mill
Continental Steel Corp.	Kokomo, Ind.	United	New	16"-14"-12"-10" rod mill
Connors Steel Co.	Birmingham		New	2-S 18" breakdown mill
Crucible Steel Co.	Harrison, N. J.			14" size D
	Midland, Pa.		Modernized	24" bar mill
Ford Motor Co.	River Rouge, Mich.	E. W. Bliss	New	21" & 53" x 66" 4-H cold mill
	Dearborn	United	Modernized	66" 4-H hot mill
Great Lakes Steel Corp.	Detroit	Mesta	New	20" & 53" x 93" 4-H skin pass mill
Jones & Laughlin Steel Corp.	Pittsburgh	Mesta	New	48" 2-H rev. slabbing & blooming mill
	Pittsburgh			1-stand, rev. 2-H 46" slabbing mill
	Pittsburgh	United	New	16"-12"-10" bar mill
Kaiser Steel Corp.	Fontana, Cal.			38" electrolytic, cont. tinning line
	Fontana, Cal.	United	New	44" 4-H 2-H temper mill & 44" 4-H 5-stand cold mill
Latrobe Steel Co.	Latrobe, Pa.	Lewis Fdry. & Mach. Co.	New	2-12" x 36" 3-H mills
Lone Star Steel Co.	Lone Star, Tex.	United		Bloom & slab; rev. 4-H strip mill
Metals & Controls Co.	Attleboro, Mass.	Lewis Fdry. & Mach. Co.	New	6" & 24" x 18" 4-H mill
Northwestern Steel & Wire Co.	Sterling, Ill.			46" rev. blooming mill & 25" twin billet mill
Pittsburgh Steel Co.	Allenport, Pa.	E. W. Bliss	New	32" x 66" 2-H cold mill
	Allenport, Pa.	United	New	66" hot strip mill
Republic Steel Corp.	Cleveland	United	New	72" 4-H temper pass mill & 72" 4-H 4-stand tandem cold mill
J. A. Roebling's Sons Co.	Trenton, N. J.	Morgan Constr.	Modernized	Cont. wire rod mill
Rotary Electric Steel Co.	Detroit	Birdsboro Steel	New	22" cont. billet slab & sheet bar mill
Sheffield Steel Corp.	Kansas City	Birdsboro Steel	New	32" blooming mill
	Kansas City	Morgan Constr.	Modernized	Cont. rod & merchant mill
Simonds Saw & Steel Co.	Lockport, N. Y.	Lewis Fdry. & Mach. Co.	New	2-26" x 44" 2-H stands
U. S. Steel Co.	Morrisville, Pa.	E. W. Bliss	New	19" & 53" x 48" 2-stand 4-H cold mill
U. S. Steel Co.	Morrisville, Pa.	E. W. Bliss	New	32" x 80" 2-H cold mill
Vanadium-Alloys Steel Co.	Monaca, Pa.			22" bar mill
West Virginia Steel	Huntington, W. Va	Birdsboro Steel	Modernized	28" blooming mill

1 STEEL INDUSTRY

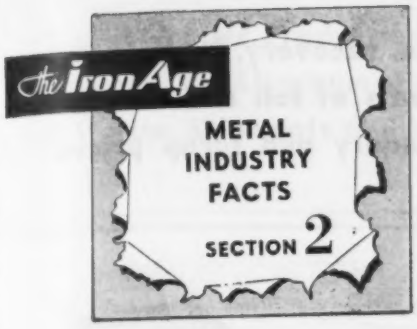
Financial analysis of the steel industry . . . Earnings, capacity, production, sales, shipments, invested capital by companies.

FINANCIAL ANALYSIS OF THE STEEL INDUSTRY

For Years 1951, 1950, 1949. Data Cover 27 Companies Representing 92 Pct of U. S. Ingot Capacity

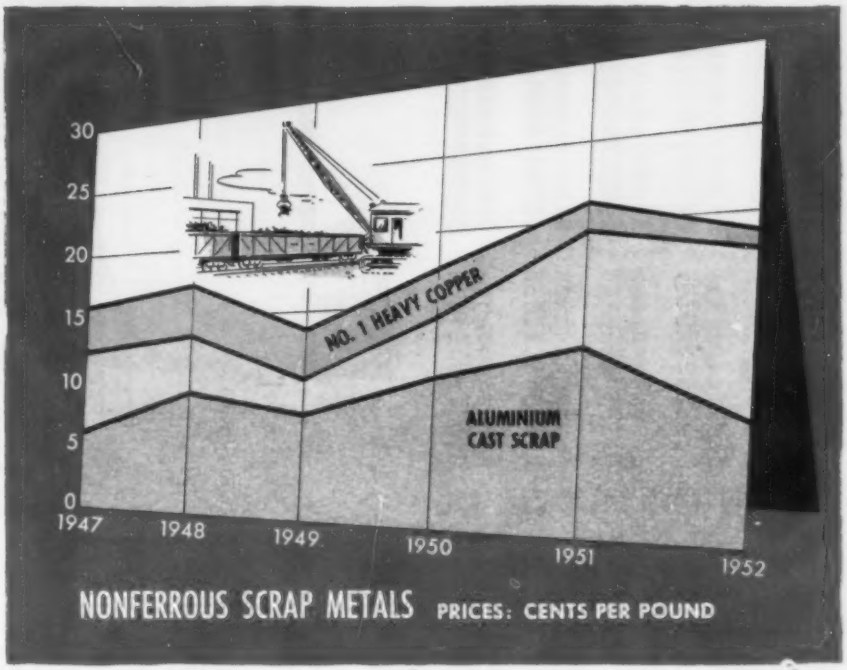
COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Provision for Federal Income Taxes	Net Income	Net Income Percent of Sales	Earnings Per Common Share	Invested Capital
U. S. Steel Corp.	1951	34,600,000	34,323,000	101.3	24,626,000	$3,524,121,226	$398,000,000	$184,359,787	5.2	$6.10	$2,150,858,480
	1950	33,900,000	31,457,000	98.2	22,635,000	2,956,406,146	234,000,000	215,464,142	7.3	7.29	2,076,950,448
	1949	32,000,000	25,807,000	82.5	18,212,000	2,301,685,609	126,000,000	165,908,829	7.2	5.39	1,983,557,284
Bethlehem Steel Corp.	1951	16,000,000	16,405,677	102.5	12,138,732	1,799,506,346	162,000,000	106,531,293	5.9	10.43	1,083,925,932
	1950	15,000,000	15,116,456	100.8	10,933,266	1,445,404,331	122,000,000	122,976,071	8.5	12.15	977,709,177
	1949	14,200,000	12,506,949	88.7	9,217,188	1,271,040,076	66,500,000	99,283,539	7.8	9.68	903,780,929
Republic Steel Corp.	1951	9,490,000	9,142,696	102.0	6,993,619	1,052,715,386	117,500,000	54,921,541	5.2	9.03	562,829,895
	1950	8,967,000	8,551,013	98.3	6,388,157	881,753,328	79,200,000	63,794,711	7.2	10.53	439,440,217
	1949	8,700,000	6,804,020	79.1	5,123,608	651,952,835	35,000,000	46,142,323	7.1	7.54	413,893,344
Jones & Laughlin Steel Corp.	1951	4,847,000	5,032,000	104.0	4,000,000	564,330,000	54,339,000	30,998,000	5.5	4.76	463,219,000
	1950	4,847,000	4,844,000	102.0	3,844,000	487,451,000	33,850,000	39,744,000	8.2	14.72	377,236,000
	1949	4,816,500	4,170,432	87.0	3,042,298	386,046,149	13,150,000	20,961,245	5.4	7.50	324,527,137
National Steel Corp.	1951	4,780,000	.....	.....	.....	619,461,408	95,000,000	45,287,093	7.32	6.15	354,559,375
	1950	4,800,000	.....	.....	.....	537,624,673	61,100,000	57,814,974	10.77	7.85	331,006,167
	1949	4,200,000	.....	.....	.....	424,692,245	37,400,000	39,311,269	9.3	16.02	294,829,694
Armco Steel Corp.	1951	4,625,000	4,357,662	96.3	3,286,554	524,634,687	69,141,282	35,004,487	6.54	6.69	338,788,086
	1950	4,330,000	3,988,727	91.4	2,976,293	439,266,931	48,173,228	47,000,505	10.70	11.76	288,944,394
	1949	3,793,000	3,131,020	82.5	2,269,103	341,350,147	19,315,315	30,918,202	9.1	7.68	261,887,665
Youngstown Sheet & Tube Co.	1951	4,370,000	4,451,854	104.7	3,362,104	489,305,162	38,692,000	30,644,201	6.34	9.15	345,850,109
	1950	4,250,000	4,124,781	101.0	3,031,676	409,698,010	33,820,000	40,616,403	10.05	12.12	301,756,047
	1949	4,062,000	3,478,259	85.2	2,550,360	338,344,004	19,894,000	31,777,010	9.5	18.97	272,689,691
Inland Steel Co.	1951	3,750,000	3,837,268	102.3	2,896,888	521,449,655	53,520,000	34,398,585	6.6	7.02	290,882,261
	1950	3,750,000	3,675,707	102.8	3,406,564	461,376,000	41,224,700	38,015,676	8.2	7.76	275,631,279
	1949	3,400,000	3,019,655	88.8	2,715,298	347,640,710	15,935,000	25,013,707	7.2	5.11	256,783,208
Wheeling Steel Corp.	1951	1,800,000	1,874,236	100.8	.....	229,012,621	33,662,000	17,392,959	7.59	10.96	192,703,514
	1950	1,800,000	1,636,475	84.7	.....	186,723,442	17,342,000	18,314,517	9.81	11.59	169,823,166
	1949	1,636,000	1,227,000	78.9	.....	143,419,446	5,819,000	7,896,265	5.5	10.68	158,195,963
Sharon Steel Corp.	1951	1,800,000	1,800,205	103.2	1,128,423	169,961,946	18,480,000	8,861,187	5.2	8.06	68,296,426
	1950	1,441,400	1,448,978	100.5	1,047,795	136,120,769	9,620,000	9,284,643	6.8	10.03	55,646,963
	1949	1,672,000	1,001,625	59.9	738,884	90,068,864	1,650,000	3,325,964	3.7	5.39	49,917,062
Colorado Fuel & Iron Corp.	1951	1,522,884	1,615,246	106.08	1,208,885	191,444,412	18,936,500	10,382,228	5.42	5.06	96,882,288
	1950	1,472,000	1,198,531	81.42	1,115,804	112,642,939	2,704,300	4,406,226	3.91	3.30	82,383,166
	1949	1,472,000	1,446,693	98.3	1,340,158	138,344,200	8,059,200	10,162,919	7.4	8.46	77,408,438
Kaiser Steel Corp.	1951	1,300,000	1,217,196	101.4	869,420	100,471,475	8,660,017	7,510,861	7.5	1.86	172,834,377
	1950	1,200,000	1,101,961	104.6	770,662	84,480,616	8,100,000	11,940,593	14.1	None	136,767,059
Crucible Steel Co. of America	1951	1,198,980	.....	.....	.....	202,868,727	18,099,421	8,363,225	4.12	11.89	105,875,766
	1950	1,153,485	.....	.....	.....	147,607,941	8,200,523	6,311,254	4.27	9.73	95,639,334
	1949	1,112,984	.....	.....	.....	89,393,228	351,827	1,352,764	1.4	None	92,304,721
Pittsburgh Steel Co.	1951	1,072,000	1,091,384	100.8	1,140,639	180,462,914	16,071,000	7,331,599	4.87	5.99	81,183,695
	1950	1,072,000	1,074,340	100.22	1,001,297	119,185,237	6,510,000	8,350,410	5.33	6.13	59,054,164
	1949	1,072,000	717,283	66.9	595,486	80,569,351	624,000	844,810	1.1	.04	54,186,177
Barium Steel Corp.	1951	693,000	627,220	70.23	None	91,642,638	8,665,674	4,164,177	4.5	1.87	18,345,693
	1950	693,000	471,695	54.0	None	53,523,876	1,752,842	1,474,226	2.8	.66	15,034,143
	1949	406,000	186,485	45.9	131,414	33,885,646	869,463	711,452	2.1	.33	13,295,963
Allegheny Ludlum Steel Corp.	1951	817,200	817,068	100.0	676,980	229,050,224	20,180,000	8,834,140	3.86	5.40	73,240,773
	1950	832,360	701,669	85.5	617,710	177,661,693	10,250,000	9,814,891	5.52	7.07	60,701,579
	1949	832,360	562,813	67.8	297,635	105,663,359	1,200,000	1,967,324	1.9	1.15	52,659,400
Granite City Steel Co.	1951	720,000	746,911	103.7	821,198	86,773,183	7,980,000	5,142,520	5.9	4.02	57,266,370
	1950	620,000	661,510	109.9	555,868	80,234,883	5,420,000	5,727,406	9.6	11.52	32,137,772
	1949	620,000	531,824	85.8	464,131	46,486,823	1,860,000	2,958,109	6.4	7.44	21,050,032
Lukens Steel Co.	1951	675,000	666,063	101.64	541,376	80,546,418	8,805,500	3,549,567	4.4	11.16	25,120,524
	1950	675,000	621,761	92.11	439,067	62,936,661	1,805,824	1,922,037	3.63	6.04	23,770,861
	1949	675,000	545,283	80.8	306,460	55,825,306	1,840,330	1,930,045	3.5	6.07	23,107,677
Detroit Steel Corp.	1951	660,000	644,788	97.7	760,940	113,747,043	21,812,229	10,514,896	9.2	8.87	33,726,306
	1950	660,000	663,983	99.1	805,669	82,949,224	8,615,770	8,943,140	9.6	7.64	25,582,956
	1949	660,000	511,647	77.5	326,386	49,744,661	3,012,000	4,885,424	9.8	3.87	21,760,173
Alan Wood Steel Co.	1951	626,000	623,232	99.7	465,231	58,764,602	4,192,000	2,303,720	3.9	3.32	29,481,987
	1950	560,000	485,607	88.3	337,415	44,954,626	1,745,000	2,546,902	5.7	3.92	28,668,828
	1949	560,000	381,710	69.4	270,803	35,695,460	1,480,000	2,255,840	6.3	3.76	27,548,014
Copperweld Steel Co.	1951	554,000	.....	.....	.....	76,185,026	5,510,000	2,703,165	3.5	5.14	18,420,049
	1950	554,400	.....	.....	.....	55,596,047	1,800,000	2,572,539	4.6	4.88	17,032,500
	1949	554,400	.....	.....	.....	42,708,229	900,000	1,737,806	4.1	3.24	16,620,337
Rotary Electric Steel Co.	1951	425,000	372,146	87.6	279,662	40,593,066	5,015,000	2,482,974	6.1	8.55	13,919,063
	1950	425,000	382,764	90.1	307,423	31,103,866	1,910,000	2,150,170	6.9	11.10	10,856,108
	1949	420,000	247,360	58.9	213,976	16,665,512	965,000	1,287,063	7.6	6.7	10,083,290
Laclede Steel Co.	1951	410,000	369,662	85.0	360,230	47,657,001	5,075,000	2,797,598	5.87	13.57	16,926,698
	1950	397,845	360,368	90.7	332,426	39,615,464	3,383,000	3,222,475	8.13	15.62	14,706,971
	1949	326,625	263,488	87.0	263,662	31,209,110	1,815,000	2,718,352	8.7	13.18	12,733,916
Keystone Steel & Wire Co.	1951	400,000	323,556	81.0	284,669	44,406,154	6,130,640	4,724,286	10.64	2.52	20,940,221
	1950	325,000	342,469	105.4	286,666	43,206,187	5,609,721	6,477,387	14.99	3.45	19,216,025
	1949	302,400	308,131	101.9	276,663	36,736,469	2,600,000	5,084,181	13.8	2.71	16,662,298
Continental Steel Corp.	1951	384,000	363,484	92.3	280,601	39,866,978	4,150,000	1,530,371	3.84	3.05	16,466,435
	1950	383,765	372,138	94.5	282,802	36,428,123	3,220,000	2,660,153	7.30	5.31	15,923,854
	1949	364,000	229,736	65.9	.....	22,505,162	785,000	636,716	2.8	1.27	14,978,249
Northwestern Steel & Wire Co.	1951	321,000	338,690	105.5	279,662	42,681,692	3,666,700	2,915,271	6.8	3.56	12,350,837
	1950	321,000	282,974	88.2	237,780	31,670,380	1,660,000	2,416,222	7.6	2.95	9,177,398
	1949	321,000	288,814	90.0	231,163	28,664,916	1,165,000	2,243,938	7.9	2.74	8,761,176
The Midvale Co.	1951	274,884	119,502	43.65	.....	23,797,334	.....	1,619,825	6.81	2.70	17,346,697
	1950	417,624	51,420	12.31	.....	11,394,397	.....	51,143	0.45	0.09	16,326,169
	1949	449,960	67,647	15.0	.....	13,729,443	None	*1,094,387*	*8.0*	*1.82*	15,784,139
GRAND TOTAL	1950	92,647,884	90,000,000	96.7	67,500,000	$9,082,863,220	$744,872,018	$720,900,698	7.9	.....	$5,821,985,695
	1949	88,226,619	71,700,000	81.0	53,705,000	7,134,776,400	365,980,188	511,527,164	7.2	.....	5,395,896,275
Percent change, 1950 over 1949		+5.0	+25.5	+19.4	+25.7	+27.4	+103.5	+40.9	+9.7	.....	+7.9
GRAND TOTAL	1951	98,884,178	98,988,000	100.9	71,000,000	$11,126,397,324	$1,201,244,173	$635,269,756	5.7	.....	$6,671,436,069
	1950	94,747,849	90,841,000	96.7	66,400,000	9,137,146,720	752,647,018	732,012,816	8.0	.....	5,958,063,263
Percent change, 1951 over 1950		+3.5	+8.9	+4.3	+6.9	+21.7	+59.6	−13.2	−28.7	.....	+12.0

Italics indicate loss.



NONFERROUS METALS

PRODUCTION • PRICES • MINING • SCRAP



IN THIS SECTION:

ALUMINUM

Page

Bauxite imports 417
Distribution 417
Exports 416
Extrusions 416
Foil 416
Imports 416
Prices 416, 417
Production 416, 417
Recovery of secondary 416
Scrap 416
Shipments 416, 417

ANTIMONY 419, 420

BRASS 419

BRONZE 419

CADMIUM 423

COBALT 421

CONSUMPTION

Cobalt 421
Copper, refined 418
Magnesium 422
Nickel 420
Zinc, slab 422

COPPER

Consumption 418
Exports 418
Imports 418
Prices 418
Production 417, 418
Recovery of secondary 418

EMPLOYMENT

Nonferrous metals 424

EXPORTS

Aluminum 416
Cadmium 423
Copper 418
Zinc 423

IMPORTS

Aluminum 416
Antimony 419
Bauxite 417
Cadmium 423
Copper 418
Mercury 424
Nickel 420
Zinc 422

INGOT PRICES

Aluminum, remelt 416
Brass (88-10-2) 419
Bronze (85-5-5-5) 419

LEAD 421, 424

MAGNESIUM 422, 423

MERCURY 424

MOLYBDENUM 424

NICKEL 420

PRICES

Aluminum 416, 417
Antimony 420
Brass 419
Bronze Ingots (88-10-2) 419
Cadmium, sticks, bars 423
Cobalt, 97 to 99 pct 421
Copper 418
Lead, common grade 421
Magnesium, 99.8 pct plus 423
Nickel, electrolytic 420
Tin, Straits 421
Zinc, prime western 423

PRODUCTION

Aluminum 416, 417
Antimony 419, 420
Cadmium 423
Cobalt 421
Copper 417, 418
Magnesium 422
Mercury 424
Molybdenum 424
Nickel 420
Vanadium 424

SCRAP PRICES

Aluminum, cast 416
Brass, No. 1 Comp. 419
Copper, No. 1 Heavy 418

SHIPMENTS

Aluminum 416, 417
Brass ingots 419
Bronze ingots 419

TIN 421

VANADIUM 424

ZINC 422, 423

2 NONFERROUS

Aluminum production, recovery, imports and exports . . . Shipments of foil and wrought products . . . Secondary and scrap prices.

U. S. ALUMINUM PRODUCTION

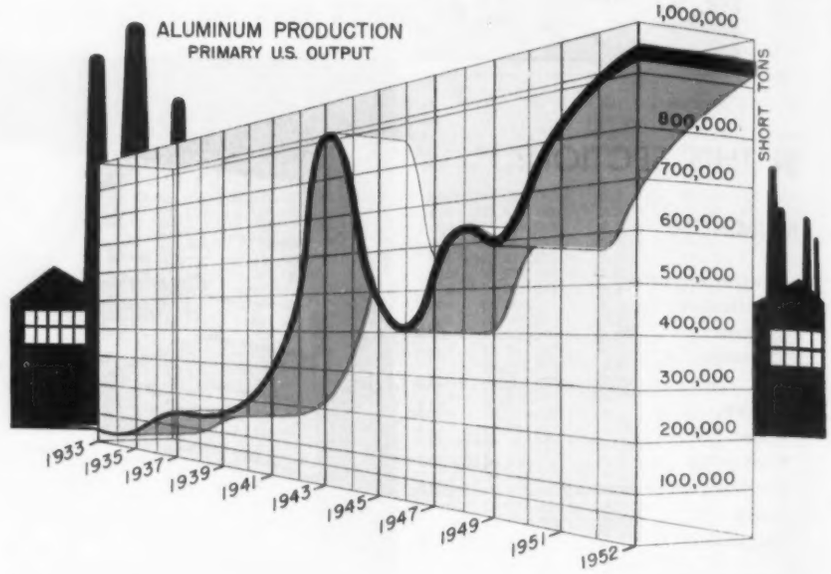
Short Tons, Primary Metal Only

	1945	1946	1947	1948
Jan.	48,650	24,750	50,045	46,767
Feb.	45,650	22,250	47,002	45,899
March	53,100	26,000	53,032	51,874
April	51,600	25,900	51,007	53,277
May	52,000	24,650	51,116	55,450
June	47,500	27,800	46,259	48,557
July	47,900	35,750	47,998	52,937
Aug.	45,800	39,850	47,054	54,953
Sept.	31,600	41,100	43,228	53,255
Oct.	25,000	45,000	43,959	54,526
Nov.	20,800	46,300	43,461	50,714
Dec.	24,000	50,700	47,589	53,474
Total	495,060	409,630	571,750	623,483

	1949	1950	1951	1952
Jan.	53,356	52,023	67,954	76,934
Feb.	49,749	50,443	62,740	72,374
March	54,852	58,747	70,022	77,069
April	54,076	58,024	67,701	76,880
May	56,909	61,929	67,720	80,804
June	54,184	60,400	67,454	77,476
July	55,777	63,518	72,698	78,368
Aug.	52,005	63,006	73,816	85,175
Sept.	49,742	59,449	69,429	78,882
Oct.	45,790	62,916	72,647	77,312
Nov.	35,865	62,276	72,248	78,000*
Dec.	41,161	65,897	72,454	82,500*
Total	603,462	718,622	836,881	939,773*

* Estimate.

Source: U. S. Bureau of Mines and Aluminum Association



RECOVERY OF SECONDARY ALUMINUM IN U. S.

Short Tons, Broken Down by Form of Recovery, 1945

Form of Recovery	1945	1946	1947	1948	1949	1950	1951
As Metal	2,145	2,075	5,105	2,384	343	2,140	5,341
Aluminum Alloys	293,957	274,068	338,200	282,302	178,502	239,577	283,938
In Brass and Bronze	1,162	597	307	455	450	270	385
In Zinc-Base Alloys	267	504	624	776	800	868	1,204
In Magnesium Alloys	...	266	222	354	426	480	346
In Chemical Compounds	846	563	379	506	441	331	1,394
Total	298,387	278,073	344,837	286,777	180,782	243,686	292,608

Source: U. S. Bureau of Mines

U. S. ALUMINUM IMPORTS

Short Tons, Imports for Consumption

	Semi-Finished Products†	Metal, Alloys Crude	Scrap
1940	562	17,435	641
1941	528	12,830	55
1942	5,855	106,257	24
1943	76	135,505	241
1944	654	100,315	1,784
1945	1,688	332,437	5,158
1946	1,120	41,487	14,493
1947	31	15,579	15,719
1948	5,912	83,277	71,768
1949	7,863	77,342	40,120
1950	10,692	176,489	68,247
1951	19,243	122,402	16,479
1952:			
January	1,587	11,824	899
February	1,378	6,397	960
March	1,277	7,813	1,529
April	781	6,874	402
May	804	8,243	256
June	418	12,913	229
July	807	13,246	395
August	587	8,642	172
September	1,217	9,177	489
1952:			
Nine Months	8,856	85,129	5,331

† Plates, sheets, bars, etc.

Source: U. S. Bureau of Mines

ALUMINUM FOIL SHIPMENTS

Pounds, Earlier Data Not Available

1950	90,679,719
1951	94,246,269
1952:	
January	6,537,465
February	6,127,732
March	5,663,830
April	6,013,522
May	6,216,916
June	6,030,198
July	5,561,976
August	6,445,778
September	6,746,675
October	8,106,545
1952:	
First 10 months	63,450,637

ALUMINUM WROUGHT PRODUCTS

Short Tons of Shipments Since 1943

	Total	Plate, Sheet and Strip	Rolled Structurals, Rod, Bar, Wire	Extruded Shapes, Tubing and Blooms	Powder, Flake, Paste
1943	.....	420,500	.....	.....	.....
1944	.....	448,900	.....	.....	.....
1945	.....	369,300	.....	.....	.....
1946	570,425	433,491	65,319	63,039	8,576
1947	704,076	555,580	78,690	61,524	8,283
1948	820,103	634,149	91,496	85,982	8,477
1949	579,073	395,013	101,825	74,998	7,238
1950	844,845	571,092	134,890	127,615	11,248
1951	878,122	536,684	172,581	156,472	12,385
1952*	790,072	441,905	187,385	141,051	19,731

* 10 months total.

Source: U. S. Bureau of the Census

U. S. ALUMINUM EXPORTS

Short Tons, by Form, Since 1935

	Semi-Finished Products†	Manufactured Products*	Ingots, Slabs Crude	Scrap
1940	14,659	3,497	12,227	955
1941	6,655	1,178	750	57
1942	20,913	4,979	17,834	32
1943	60,851	7,533	56,741	14
1944	55,019	19,326	133,089	413
1945	3,532	6,512	2,209	802
1946	15,587	5,427	1,107	640
1947	50,235	10,204	12,098	788
1948	47,869	7,199	1,239	438
1949	26,764	4,932	8,018	397
1950	19,823	.....	661	794
1951	10,993	.....	961	1,460
1952:				
7 mos.	4,098	.....	770	...

† Plates, sheet, bars, etc.

* Includes only tubes, moldings, foil and leaf, table, kitchen and hospital utensils, powders and pastes up to 1948. In 1949, wire and manufactures, and materials for construction were also included.

Source: U. S. Bureau of Mines

ALUMINUM SCRAP, CAST

Cents Per Pound, f.o.b. New York*

	1948	1949	1950	1951	1952
Jan.	6.15	12.00	7.38	15.55	7.75
Feb.	6.75	10.25	7.25	15.50	7.75
March	6.75	8.10	7.25	15.63	7.75
April	7.05	6.72	7.38	16.88	7.75
May	8.25	6.25	7.88	17.25	7.75
June	9.00	5.65	8.65	17.25	7.25
July	10.65	5.38	8.75	8.15	7.25
Aug.	11.00	6.25	9.88	7.75	7.25
Sept.	9.85	7.30	12.00	7.75	7.25
Oct.	9.88	7.50	13.88	7.75	7.75
Nov.	11.88	8.00	15.15	7.75	7.75
Dec.	12.55	7.75	15.75	7.75	7.75
Average	9.15	7.60	10.10	12.08	7.51

* Dealers' Buying Price.

REMELT ALUMINUM INGOT

No. 12, Cents Per Pound, Cars*

	1948	1949	1950	1951	1952
Jan.	15.60	25.50	16.50	30.60	19.50
Feb.	16.31	23.53	16.50	30.25	19.50
March	16.50	20.25	16.30	30.50	19.50
April	16.92	17.59	16.06	30.75	19.50
May	19.00	16.50	16.75	30.75	19.50
June	19.81	15.04	17.73	30.75	19.50
July	23.67	14.63	18.13	19.50	18.90
Aug.	23.75	15.38	21.85	19.50	19.20
Sept.	23.60	15.75	26.25	19.50	19.50
Oct.	23.63	15.75	27.06	19.50	19.50
Nov.	25.84	16.13	30.175	19.50	19.50
Dec.	26.50	16.50	31.00	19.50	19.50
Average	20.93	17.71	21.19	25.05	19.42

* Delivered.

World Copper Production . . . U. S. Bauxite Imports . . . Aluminum Distribution, Prices, Extrusion Shipments and World Production.

2 NONFERROUS

WORLD PRODUCTION OF ALUMINUM SINCE 1943

Short Tons, Not Including Russian Production and the Small Output in Brazil.

Country	1943	1944	1945	1946	1947	1948	1949	1950	1951
United States	920,179	776,446	495,060	409,630	571,750	623,456	603,462	718,422	836,881
Canada	495,750	462,065	215,713	194,117	299,066	357,079	369,466	394,756	444,741
Total America	1,415,929	1,238,511	710,773	603,747	870,816	980,535	972,928	1,113,378	1,281,622
Austria	50,700	.....	5,787	1,138	4,786	14,723	16,309	19,828	14,063
France	51,257	28,825	41,033	52,857	58,670	71,418	59,679	66,926	100,423
Germany	223,842	210,539	*22,000	.....	.....	(c)8,053	31,797	30,686	81,718
Great Britain	82,341	39,724	35,722	35,329	32,407	33,629	33,986	33,004	31,052
Italy	52,020	18,514	4,792	12,189	27,402	36,466	28,302	40,862	54,839
Hungary	10,428	14,539	2,592	2,172	5,735	10,362	9,039	.....	.....
Norway	25,919	22,085	5,079	18,400	23,947	34,216	39,349	52,036	56,447
Spain	879	227	653	1,110	1,102	577	728	2,389	4,200
Sweden	HH 3,937	4,104	3,567	3,931	3,188	3,814	4,331	4,451	7,300
Switzerland	*22,000	*8,000	*5,500	15,400	20,348	20,994	23,148	23,148	29,762
Yugoslavia	.....	.....	.....	625	1,392	2,077	2,748	2,129	3,209
Total Europe (a)	503,323	390,756	126,725	143,131	178,975	235,129	250,016	.....	.....
Others (c):									
Taiwan Province, China	11,777	8,807	653	.....	.....	.....	.....	.....	2,864
India	1,402	1,899	2,485	3,624	3,601	3,765	3,909	4,028	4,311
Japan	119,062	120,728	18,135	3,519	2,976	7,672	23,393	27,793	36,906
Korea	13,811	14,267	.....	.....	.....	.....	.....	.....	.....
Manchuria (b)	9,432	8,800	.....	.....	.....	.....	.....	.....	.....

(a) Excluding Russia and East Germany. (b) Fiscal year beginning April 1. (c) Practically all by the Toeging works in American Zone.
*Estimated.

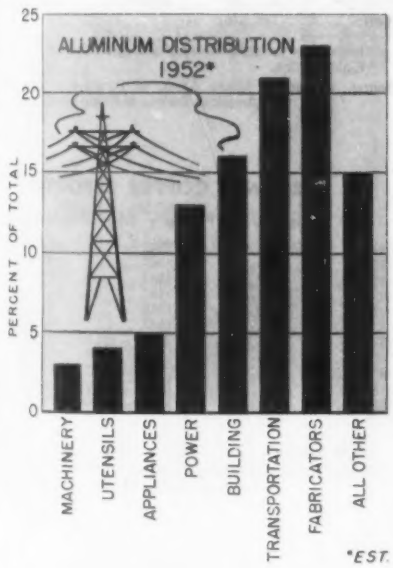
Source: American Bureau of Metal Statistics.

ALUMINUM 99 PCT PLUS

Cents Per Pound, Freight Allowed

	1936	1937	1938	1939	1940	1941
Jan.	20.50	20.50	20.00	20.00	20.00	17.00
Feb.	20.50	20.50	20.00	20.00	20.00	17.00
March	20.50	20.00	20.00	20.00	20.00	17.00
April	20.50	20.00	20.00	20.00	19.00	17.00
May	20.50	20.00	20.00	20.00	19.00	17.00
June	20.50	20.00	20.00	20.00	19.00	17.00
July	20.50	20.00	20.00	20.00	19.00	17.00
Aug.	20.50	20.00	20.00	20.00	18.00	17.00
Sept.	20.50	20.00	20.00	20.00	18.00	17.00
Oct.	20.50	20.00	20.00	20.00	18.00	15.00
Nov.	20.50	20.00	20.00	20.00	17.50	15.00
Dec.	20.50	20.00	20.00	20.00	17.00	15.00
Average	20.50	20.00	20.00	20.00	18.71	16.50

	1947	1948	1949	1950	1951	1952
Jan.		15.00	17.00	17.00	19.00	19.00
Feb.	1947	15.00	17.00	17.00	19.00	19.00
March	1946	15.00	17.00	17.00	19.00	19.00
April	1945	15.00	17.00	17.00	19.00	19.00
May	1944	15.00	17.00	17.20	19.00	19.00
June	1943	15.00	17.00	17.50	19.00	19.00
	1942					
July	price	16.00	17.00	17.50	19.00	19.00
Aug.	fixed	16.00	17.00	17.50	19.00	20.00
Sept.	at	16.00	17.00	17.69	19.00	20.00
Oct.	15.00	16.70	17.00	19.00	19.00	20.00
Nov.		17.00	17.00	19.00	19.00	20.00
Dec.		17.00	17.00	19.00	19.00	20.00
Average		15.66	17.00	17.70	19.00	19.42



U. S. BAUXITE IMPORTS

Long Tons, By Country of Origin

	Total	Surinam	British Guiana	Indonesia
1944	560,451	518,208	42,253	.....
1945	739,581	713,854	25,727	.....
1946	852,005	802,288	49,595	.....
1947	1,821,580	1 660,823	108,562	52,195
1948	2,448,915	2 051,265	114,764	302,079
1949	2,588,164	2 013,187	99,821	575,137
1950	2,476,694	1 923,663	91,398	447,457
1951	2,829,929	2 318,917	127,477	365,309
1952:				
1st Qtr	848,689	780,111	47,610	19,425
2nd Qtr	729,952	666,207	37,193	*21,281
3rd Qtr	948,599	782,591	52,137	*108,683

* Jamaica

Source: U. S. Department of Commerce

WORLD PRODUCTION OF COPPER FROM ORES

Short Tons, Not Including Copper Derived From Scrap.

Country	1943	1944	1945	1946	1947	1948	1949	1950	1951
United States	1,114,149	1,006,853	805,174	803,868	874,105	855,198	781,974	915,446	938,133
Mexico	50,642	47,589	67,784	64,893	72,875	83,928	70,632	85,238	80,875
Canada	287,595	273,535	237,457	183,968	225,851	240,732	283,457	284,209	270,483
Newfoundland	6,200	5,500	5,200	4,900	4,250	4,550	.....	.....	.....
Cuba	7,059	7,257	9,994	12,480	15,132	17,998	19,173	22,833	21,529
Bolivia	6,626	6,800	6,721	6,754	6,879	7,293	5,593	5,185	5,342
Chile	548,013	549,517	518,304	397,972	470,318	490,597	409,055	399,857	418,572
Peru	36,825	35,710	35,181	27,108	24,793	19,917	30,819	32,932	35,924
Ecuador	3,000	4,065	4,216	2,886	158	523	776	580	.....
Total America	2,060,109	1,936,826	1,690,031	1,304,629	1,694,172	1,700,704	1,561,441	1,701,623	1,750,858
Austria	1,505	1,853	353	138	285	1,082	1,423	1,808	2,026
Finland	17,073	17,482	16,510	19,400	19,200	25,713	20,811	18,933	19,517
Germany	25,766	23,148	6,600	516(c)	283(c)	401(c)	962(c)	1,500(c)	1,851(c)
Italy	2,800(b)	400	2,400	115	105	99	33	20	68
Norway	17,900	15,900	5,735	13,500	16,212	16,658	16,393	17,219	15,873
Spain	12,200	12,100	9,100	13,400	7,114	6,065	7,389	6,802	7,500
Sweden	19,656	17,770	16,453	16,934	14,489	16,353	17,939	17,746	15,900
Yugoslavia	29,800	25,000	13,800	35,500	44,600	57,900	37,500	47,722	39,628
Other Europe	1,000	1,100	700	500	1,000	16,800	17,000	16,600	15,000
Total Europe	127,700	114,533	71,651	100,003	103,268	141,072	125,459	128,410(a)	117,361(a)
Formosa	6,636	4,393	.....	.....	.....	.....	.....	.....	.....
Japan	104,419	95,728	30,847	18,899	24,127	28,353	36,090	43,345	46,625
India (c)	6,832	6,418	6,720	7,068	8,643	8,567	7,157	7,408	7,933
Turkey	10,725	12,076	10,800	10,979	11,111	12,102	11,889	12,793	17,884
Philippines	9,800	2,400	2,300	.....	2,502	2,300	7,724	11,446	14,012
Cyprus	5,706	1,695	1,100	2,950	17,400	21,500	30,912	25,685	25,145
South Korea	2,262	2,998	1,379	575	429	73	31	30	25
Other Asia	9,200	8,300	1,800	4,000	6,500	7,500	9,800	9,800	10,000
Tota Asia	148,944	129,815	54,946	44,461	68,712	78,395	103,603	110,607	121,624
Belgian Congo	172,896	182,413	176,800	158,604	166,271	171,424	155,864	193,917	211,595
Rhodesia	276,955	246,498	215,572	204,922	218,222	234,647	289,948	314,589	349,667
Southwest Africa	5,500	.....	.....	.....	4,575	6,816	9,514	10,378	12,161
Union of South Africa	25,100	25,935	27,211	30,000	32,400	32,300	33,060	36,755	35,384
Other Africa	500	800	200	200	100	900	1,300	1,750	1,500
Total Africa	480,951	455,646	419,883	393,726	421,568	445,887	489,684	557,689(a)	611,288
Australia	27,300	31,500	27,500	19,885	14,699	13,793	15,080	19,710	17,708
Russia	143,300	148,800	154,300	165,300	181,900	198,400	220,500	240,000	260,000
Total World, as Reported	2,988,304	2,816,720	2,418,011	2,028,005	2,484,318	2,578,251	2,515,770	2,761,624a	2,839,823

(a) Total based on incomplete returns. (b) January-June. (c) West Germany.

In this table, which surveys mine production the credits to the several countries are for copper smelted domestically plus copper in ores from them smelted in other countries; or copper content of ores and concentrates produced in countries which do no smelting.

Source: American Bureau of Metal Statistics

2 RROUS

Copper production, consumption, imports and exports . . . Scrap copper recovery and prices . . . Prices of electrolytic copper.

DOMESTIC COPPER MINE PRODUCTION, MONTHLY

Actual Mine Output Since 1944 in Short Tons

Month	1944	1945	1946	1947	1948	1949	1950	1951	1952
January	86,820	70,088	55,381	70,056	73,150	50,002	71,378	80,459	77,691
February	87,622	63,962	41,934	68,416	68,943	56,410	67,188	73,123	72,564
March	94,446	70,004	42,018	74,651	74,092	77,912	76,061	83,233	78,851
April	88,106	67,493	32,295	72,418	74,344	72,843	73,596	82,473	80,332
May	88,055	72,018	33,526	75,164	74,779	67,412	74,821	83,778	81,996
June	83,480	67,910	33,171	70,150	75,596	61,254	75,170	75,891	74,032
July	76,172	62,100	53,948	73,310	71,340	56,615	72,940	75,437	76,207
August	77,390	61,817	57,163	72,005	73,548	55,898	83,598	67,979	74,104
September	74,845	59,854	62,667	70,770	69,630	58,111	77,025	69,024	74,820
October	73,045	61,555	65,625	66,145	68,256	60,515	78,175	81,077	78,752
November	68,909	58,654	62,336	63,278	51,318	66,044	81,726	76,917	77,000*
December	71,658	57,429	68,673	71,200	50,668	69,734	80,657	78,939	78,651*
Total	972,549	772,894	609,737	847,563	825,666	752,750	909,343	928,330	925,000*

* Estimate.

Source: U. S. Bureau of Mines

CRUDE COPPER PRODUCTION

Short Tons, From Domestic Ores**

1845 to 1880	10,111*	1940	900,084
1881 to 1900	149,738*	1941	966,072
1901 to 1910	428,172*	1942	1,087,981
1911 to 1920	716,056*	1943	1,092,939
1921 to 1930	742,340*	1944	1,003,379
1931	521,356	1945	782,726
1932	272,005	1946	599,650
1933	225,000	1947	902,872
1934	244,227	1948	842,477
1935	381,294	1949	757,931
1936	611,410	1950	911,352
1937	834,661	1951	930,774
1938	562,328	1952†	688,838
1939	712,675		

* Yearly averages.
** Smelter output.
† Nine months.
Source: Bureau of Mines

SECONDARY COPPER RECOVERY

Net Tons, Showing Form of Recovery

Form of Recovery	1946	1947	1948
As unalloyed copper:			
At primary plants	105,572	269,085	245,376
At other plants	31,337	34,007	38,650
	136,909	303,092	284,026
In brass and bronze	630,598	619,576	653,281
In alloy iron and steel	1,932	2,830	2,911
In aluminum alloys	14,434	16,962	14,678
In other alloys	491	443	280
In chemical compounds	19,192	18,838	17,612
	666,637	658,649	688,762
	803,546	961,741	972,788

Form of Recovery	1949	1950	1951
As unalloyed copper:			
At primary plants	212,392	189,746	135,023
At other plants	37,697	70,958	511,439
	250,089	260,704	186,462
In brass and bronze	436,457	679,849	702,416
In alloy iron and steel	1,552	2,381	3,066
In aluminum alloys	9,951	16,621	17,230
In other alloys	254	271	203
In chemical compounds	14,840	17,413	22,905
	463,054	716,535	745,820
	713,143	977,239	932,282

Source: Bureau of Mines

ELECTROLYTIC COPPER

Cents Per Pound, Conn. Valley

	1936	1938	1939	1940		1946
Jan.	9.25	10.42	11.25	12.22		12.00
Feb.	9.25	10.00	11.25	11.40		12.00
March	9.25	10.00	11.25	11.38	1945	12.00
April	9.40	10.00	10.47	11.33	1944	12.00
May	9.50	9.60	10.06	11.32	1943	12.00
June	9.50	9.00	10.00	11.37	1942	14.28
					1941	
uly	9.60	9.81	10.22	10.81	price	14.375
Aug.	9.75	10.12	10.49	10.95	fixed	14.375
Sept.	9.75	10.25	11.93	11.54	at	14.375
Oct.	9.85	10.98	12.44	12.00	12.00	14.375
Nov.	10.43	11.25	12.50	12.00		17.19
Dec.	11.00	11.25	12.50	12.00		19.50
Average	9.71	10.22	11.20	11.53		14.04

	1947	1948	1949	1950	1951	1952
Jan.	19.56	21.50	23.50	18.50	24.50	24.50
Feb.	19.75	21.50	23.50	18.50	24.50	24.50
March	21.50	21.50	23.49	18.50	24.50	24.50
April	21.50	21.50	21.72	18.94	24.50	24.50
May	22.63	21.50	18.05	19.92	24.50	24.50
June	21.63	21.50	16.66	22.27	24.50	24.50
July	21.50	21.50	17.33	22.50	24.50	24.50
Aug.	21.50	23.43	17.63	22.54	24.50	24.50
Sept.	21.50	23.50	17.63	23.25	24.50	24.50
Oct.	21.50	23.50	17.63	24.50	24.50	24.50
Nov.	21.50	23.50	18.42	24.50	24.50	24.50
Dec.	21.50	23.50	18.50	24.50	24.50	24.50
Average	21.30	22.33	19.51	21.54	24.50	24.50

The new Iron Age Directory of tool steels begins on p. 308. It now tabulates most tool steels by SAE classification, also contains comparable brand charts.

REFINED COPPER CONSUMPTION

Primary and Secondary, Short Tons

	1949	1950	1951
Cathodes	78,537	136,663	144,397
Wire bars	650,646	763,925	765,814
Ingots, ingot bars	106,500	141,275	170,741
Cakes and slabs	164,312	212,677	187,711
Billets	123,747	161,180	135,826
Other	5,944	8,714	12,376
	1,129,686	1,424,434	1,416,865

Source: U. S. Bureau of Mines

No. 1 HEAVY COPPER SCRAP

Cents Per Pound, f.o.b. New York*

	1948	1949	1950	1951	1952
Jan.	16.85	18.75	13.97	19.75	19.00
Feb.	16.44	18.13	14.06	21.06	19.00
March	16.25	16.66	13.88	23.88	19.00
April	16.60	14.13	14.19	25.88	19.00
May	16.75	11.97	15.13	26.00	19.00
June	16.75	10.60	16.98	23.88	19.00
July	17.00	11.88	16.94	18.90	19.00
Aug.	17.68	12.31	18.66	19.00	19.00
Sept.	17.65	12.93	20.38	19.00	19.00
Oct.	17.72	12.25	22.25	19.00	19.00
Nov.	18.47	12.44	24.75	19.00	19.00
Dec.	19.25	13.26	19.75	19.00	19.00
Average	17.30	13.78	17.56	21.20	19.00

* Dealers Buying Price.

U. S. COPPER IMPORTS

Net Tons, Except Manufactures

1930	406,577	1942	757,974
1931	292,946	1943	716,596
1932	195,996	1944	765,211
1933	143,717	1945	853,196
1934	213,286	1946	396,380
1935	257,182	1947	413,890
1936	190,339	1948	507,449
1937	279,875	1949	552,709
1938	252,164	1950	690,389
1939	336,297	1951	489,378
1940	491,342	1952*	354,004
1941	735,545		

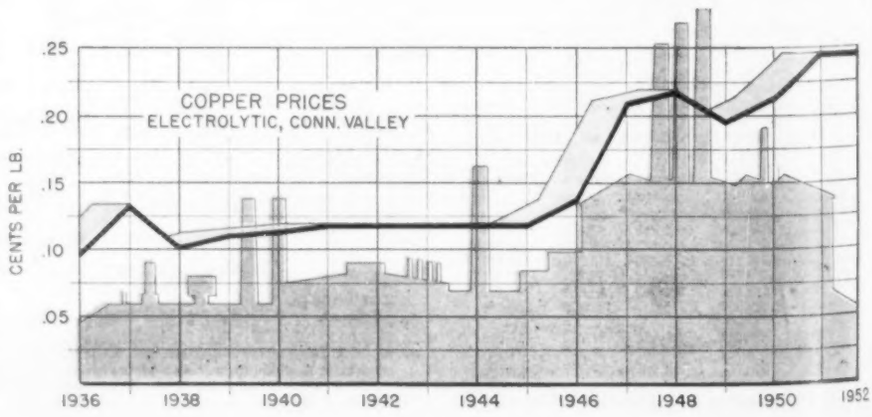
Imports for consumption plus entries under bond.
* Eight months.
Source: Bureau of Mines, Dept. of Commerce, and American Bureau of Metal Statistics

U. S. REFINED COPPER EXPORTS

Net Tons, With Primary Manufactures

1930	376,557	1942	212,309
1931	278,787	1943	294,459
1932	147,678	1944	237,515
1933	151,913	1945	132,555
1934	296,359	1946	97,475
1935	295,198	1947	196,999
1936	259,032	1948	207,022
1937	345,584	1949	195,990
1938	421,012	1950	192,339
1939	427,517	1951	166,274
1940	427,650	1952*	112,903
1941	158,893		

* Eight months.
Source: Bureau of Mines, Dept. of Commerce, and American Bureau of Metal Statistics



Imports and world production of antimony . . . Scrap brass prices . . . Remelt brass and bronze ingot shipments and prices.

NONF 2

BRASS SCRAP, No. 1 COMP.

Cents Per Pound, f.o.b. New York*

	1948	1949	1950	1951	1952
Jan.	12.45	14.19	11.13	17.25	18.25
Feb.	12.44	13.06	11.13	18.75	18.25
March	13.33	11.83	11.13	20.50	18.25
April	12.85	9.19	11.50	22.19	18.25
May	12.88	8.56	12.44	22.50	18.25
June	12.75	8.13	13.95	21.31	17.75
July	13.75	8.69	14.13	19.15	17.75
August	14.26	8.88	15.50	18.50	17.75
Sept.	13.57	9.23	17.25	18.25	17.75
Oct.	14.41	9.13	17.75	18.25	17.75
Nov.	15.19	11.06	18.88	18.25	17.75
Dec.	14.95	10.73	16.59	18.25	17.75
Average	13.57	10.22	14.26	19.43	17.96

*Dealers Buying Price.

BRONZE INGOTS, 88-10-2

No. 245, Cents Per Pound, Cars*

	1948	1949	1950	1951	1952
Jan.	23.25	24.13	19.63	36.00	33.70
Feb.	22.13	23.26	19.63	36.00	34.50
March	21.42	21.61	19.63	36.75	34.50
April	21.95	20.26	20.00	37.00	34.50
May	22.25	17.82	20.72	37.00	34.50
June	23.00	16.71	23.70	37.00	34.50
July	23.25	16.51	24.38	37.00	34.50
August	24.38	16.76	27.55	37.00	34.50
Sept.	24.80	17.41	29.88	34.38	34.50
Oct.	24.38	17.63	32.50	33.50	34.50
Nov.	25.57	18.81	36.20	33.50	34.50
Dec.	25.16	18.35	37.00	33.50	34.50
Average	23.46	19.11	25.90	35.72	34.43

*Delivered.

BRASS INGOTS, 85-5-5-5

No. 115, Cents Per Pound, Cars*

	1948	1949	1950	1951	1952
Jan.	19.60	20.38	17.50	29.00	27.25
Feb.	19.31	19.01	17.50	29.00	27.25
March	18.95	17.96	17.50	29.00	27.25
April	19.22	16.94	17.81	29.00	27.25
May	19.19	15.07	18.41	29.00	27.25
June	19.12	13.98	21.33	29.00	27.25
July	19.75	13.76	22.11	29.00	27.25
August	21.06	14.13	23.80	29.00	27.25
Sept.	21.30	14.91	25.50	27.69	27.25
Oct.	20.94	15.13	26.63	27.25	27.25
Nov.	21.65	16.81	28.60	27.25	27.25
Dec.	21.21	16.85	29.00	27.25	27.25
Average	20.11	16.24	21.14	28.45	27.25

*Delivered.

INGOT BRASS AND BRONZE

Short Tons of Shipments, Monthly*

	1948	1949	1950	1951	1952
Jan.	26,993	19,455	18,874	28,416	28,315
Feb.	22,487	15,028	18,487	27,169	24,211
March	24,202	14,550	22,494	31,937	23,890
April	25,177	10,695	22,118	30,472	22,547
May	23,716	11,114	23,643	33,287	21,740
June	24,401	9,636	25,093	33,817	21,274
July	20,456	10,220	21,609	32,018	18,917
August	24,033	14,194	23,689	25,285	21,807
Sept.	23,641	16,208	28,811	22,235	22,770
Oct.	21,553	18,033	32,243	23,124	28,811
Nov.	21,731	18,493	31,748	23,544	24,004
Dec.	20,954	17,930	28,757	20,997	.....
	279,500	175,643	333,583	332,378	.....

*Delivered.

Source: Ingot Brass & Bronze Institute

WORLD PRODUCTION OF ANTIMONY

Metric Tons. Estimated Production of Other Nations Included in Total

Country	1946	1947	1948	1949	1950	1951
North America:						
Canada[2]	291	522	141	72	[3] 292	591
Honduras	9	.....	6	9	(4)	(4)
Mexico[2]	6,572	6,925	7,380	5,753	5,868	6,824
United States	2,272	4,823	5,887	1,484	2,265	3,186
South America:						
Bolivia (exports)	6,964	10,857	12,260	10,275	8,781	11,816
Peru	1,045	1,164	1,556	[3] 729	971	1,107
Europe:						
Austria	[3] 36	[3] 114	[5] 269	[5] 379	[5] 409	[5] 498
Czechoslovakia	2,300	4,500	4,100	(6)	[7] 2,000	(6)
France	220	201	275	294	[3] 355	650
Greece	.....	.....	.....	[3] 49	[3] 350	810
Italy	403	513	[3] 559	[3] 627	[3] 679	822
Portugal	3	25	41	21	15	(6)
Spain	[3] 157	[3] 138	[3] 219	259	[3] 200	[8] 380
Yugoslavia	1,891	1,361	[3] 2,250	2,789	3,205	(6)
Asia:						
British Borneo: Sarawak	.....	.....	4	1	2	.....
Burma[7]	.....	46	121	70	6	(6)
China	426	1,909	3,251	[3 7] 4,000	[7] 6,000	[7] 8,000
Iran[9]	.....	.....	.....	175	230	[7] 230
Japan	53	108	135	172	161	221
Thailand	.....	113	92	[3] 265	[3] 87	65
Turkey (Asia Minor)	80	149	600	[3] 460	[3] 1,288	3,360
Africa:						
Algeria	.....	130	746	1,338	[3] 1,250	1,462
French Morocco	260	470	520	[3] 700	[3] 706	960
Southern Rhodesia	16	83	9	41	[3] 24	62
Spanish Morocco	[3] 117	[3] 145	[3] 272	[3] 150	[3] 353	(10)
Union of South Africa	2,525	3,302	4,106	4,461	[3] 8,311	15,858
Oceania:						
Australia	539	173	188	[3] 198	[3] 227	310
New Zealand	.....	.....	5	3	.....	.....
Total (except U.S.S.R.)	26,000	38,000	45,000	37,000	[3] 44,000	64,000

[1] Approximate metal content of ore produced, exclusive of antimonial lead ores; U.S.S.R. and Hungary produce antimony, but data on production are not available; estimates for Hungary are included in the totals.
[2] Includes antimony content of antimonial lead.
[3] Revised figure.
[4] Less than 0.5 metric ton.
[5] Excludes Soviet zone, data for which are not available, but estimates for which are included in the totals.
[6] Data not available; estimate by the author of the chapter included in total.
[7] Estimate.
[8] Including Spanish Morocco.
[9] Fiscal year ended March 20 of year following that stated.
[10] Included in Spain.

Source: U S Bureau of Mines

IMPORTS OF ANTIMONY INTO UNITED STATES

Short Tons, Imports of Antimony for Consumption Plus Entries in Bond

	1947		1948		1949		1950		1951		1952 (9 Mos.)	
	Ore Content	Metal	Ore Content	Metal	Ore Content	Metal	Ore Content	Metal	Ore Content	Metal	Ore Content	Metal
Belgium and Luxembourg	.....	56	.....	210	.....	.....	49	935	.....	319	.....	348
Bolivia†	2,435	.....	3,310	.....	3,153	.....	5,404	.....	4,609	.....	3,367	.....
Canada	145	.....	31	1	49	11	.....	.....	412	23	.....	.....
Chile†	348	.....	260	.....	544	.....	631	.....	492	.....	86	.....
China	.....	5,815	.....	2,936	.....	313	.....	.....	.....	.....	.....	317
Czechoslovakia	.....	.....	.....	.....	.....	.....	.....	.....	49	212	3	.....
France	.....	.....	93	.....	.....	.....	79	.....	90	.....	.....	.....
French Morocco	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	15	.....
Greece	.....	.....	6	.....	8	.....	.....	.....	5	.....	.....	.....
Honduras	.....	.....	.....	30	.....	41	.....	.....	.....	19	.....	.....
Italy	.....	.....	.....	.....	.....	.....	23	.....	.....	.....	.....	.....
Japan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexico	6,133	.....	8,674	54	2,935	767	3,121	1,423	4,033	1,094	1,703	905
Mozambique	.....	.....	.....	.....	.....	.....	.....	.....	90	.....	.....	.....
Netherlands	.....	.....	.....	.....	.....	11	.....	138	.....	22	.....	69
Peru†	155	.....	1,032	.....	727	.....	254	.....	443	103	230	25
Portugal	.....	.....	17	7	.....	.....	.....	.....	.....	.....	.....	.....
Siam	12	.....	55	3	.....	.....	16	.....	.....	.....	.....	.....
South Africa	.....	.....	.....	.....	.....	.....	.....	.....	1,901	.....	468	.....
Spain	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	.....	.....
Turkey	53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108
United Kingdom	.....	28	.....	.....	.....	73	.....	.....	.....	134	2	175
Yugoslavia	.....	.....	22	132	.....	472	.....	939	.....	271	.....	322
Total Imports	9,287	5,993	13,532	3,416	7,473	2,091	9,580	3,449	11,905	2,237	5,877	2,344

† Imports shown from Chile were probably mined in Bolivia or Peru.

Source: U. S. Dept. of Commerce

2 NONFERROUS

Nickel prices, use, production and imports . . . U. S. antimony prices and production.

ANTIMONY PRICES, MONTHLY 1934 TO 1952

Cents per pound for American metal f.o.b. Laredo, Tex., since Apr. 1, 1942

	1934	1936	1937	1938	1939*	1942*†	1946*	1947	1948	1949	1950	1951	1952
Jan.	7.23¾	13.22	14.06¼	15.47	14.00	16.50	14.50	28.25	33.00	38.50	30.05	34.50	50.00
Feb.	7.15	12.97	14.68¾	15.72	14.00	16.50	14.50	28.25	33.00	38.50	27.75	42.00	50.00
Mar.	7.45	13.37½	16.81¼	15.75	14.00	16.50	14.50	30.62½	33.00	38.50	24.50	42.00	50.00
Apr.	7.86¼	13.50	17.00	15.62½	14.00	14.50	14.50	33.00	33.00	38.50	24.50	42.00	50.00
May	8.35½	13.50	15.81¼	14.75	14.00	14.50	14.50	33.00	33.00	38.50	24.50	42.00	42.75
June	7.98¾	13.25	14.81¼	13.90	14.00	14.50	14.50	33.00	35.00	38.50	24.50	42.00	39.00
July	7.93¾	13.00	14.72½	14.00	14.00	14.50	14.50	33.00	35.00	38.50	24.50	42.00	39.00
Aug.	8.40	12.62½	15.34	14.00	14.00	14.50	14.50	33.00	35.00	38.50	24.50	42.00	39.00
Sept.	8.31⅞	12.50	17.85	14.00	14.00	14.50	14.50	33.00	35.00	38.50	31.13	42.00	39.00
Oct.	9.21⅞	12.50	18.31¼	14.00	14.00	14.50	14.50	33.00	36.75	33.62	32.00	42.00	39.00
Nov.	11.12½	12.50	16.43¾	14.00	16.50	15.50	21.25	33.00	38.50	32.00	32.00	45.20	35.63
Dec.	13.75	12.72½	14.60	14.00	16.50	14.50	24.68¾	33.00	38.50	32.00	32.00	50.00	34.50
Average	8.73¼	12.97¼	15.87	14.60	14.42	15.00	15.91	32.01	34.90	37.01	27.66	42.31	42.32

Asiatic antimony, New York, quoted until the end of March, 1942.
* Price unchanged at 16.50¢ during 1940 and 1941.
† Price unchanged at 14.50¢ from 1943 through 1945.

U. S. ANTIMONY PRODUCTION

Short Tons, Ore and Concentrates

	Antimony Content	Average % Sb
1932	419	46.6
1933	567	51.8
1934	404	45.0
1935	559	15.5
1936	755	19.5
1937	1,266	29.8
1938	650	23.8
1939	393	12.4
1940	494	44.0
1941	1,214	35.1
1942	2,944	42.2
1943	5,556	33.1
1944	4,735	35.1
1945	1,930	12.9
1946	2,505	17.9
1947	5,316	26.6
1948	6,489	40.0
1949	1,636	31.1
1950	2,497	36.3
1951	3,512	33.5

Source: U. S. Bureau of Mines

WORLD PRODUCTION OF NICKEL, SINCE 1942

Metric Tons, Nickel Content of Ore, Minor Producing Nations in Total

Country	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952[2]
Burma	.....	.....	.....	.....	.....	.....	(1)	(1)	(1)	(1)	.....
Canada	129,369	130,642	124,555	111,189	87,146	107,616	118,909	116,417	112,181	124,527	127,007
Cuba	(1)	2,430	4,679	10,900	11,241	2,014	.....	.....	.....	.....	7,700
Finland	1,630	8,970	313	900	622	(1)	(1)	(1)	(1)	(1)	.....
Germany	577	951	(1)	(1)	.....	.....	.....	.....	.....	.....	.....
Greece	706	495	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indonesia	[3]1,200	[3]1,200	(1)	(1)	.....	.....	.....	.....	.....	.....	.....
Japan	1,252	1,613	1,720	650	.....	.....	.....	.....	.....	.....	.....
New Caledonia	9,415	7,374	8,115	4,328	2,779	3,345	4,882	3,371	6,300	9,200	6,350
Norway	911	577	529	516	55	.....	.....	(1)	(1)	.....	.....
Sweden	377	702	698	390	.....	.....	(1)	(1)	(1)	.....	.....
South Africa	449	343	481	499	497	529	458	618	843	1,138	1,000
U. S. S. R.[2]	(1)	11,160	(1)	13,400	20,000	25,000	25,000	25,000	25,000	25,000	25,000
United States	555	592	898	1,048	319	586	801	717	828	686	900
Total (estimate)	158,000	167,000	157,000	145,000	123,000	139,000	150,000	146,000	145,000	161,000	168,000

[1] Data not available; estimate included in total.
[2] Estimate.
[3] Byproduct in electrolytic refining of copper. In 1944 and 1945 includes also production from ore.

Source: U.S. Bureau of Mines

U. S. NICKEL PRODUCTION

Short Tons, Primary and Secondary

	Primary	Secondary Recovery
1930	308	2,900
1931	373	2,070
1932	195	1,450
1933	126	1,650
1934	157	1,850
1935	160	1,950
1936	107	1,965
1937	219	2,400
1938	416	2,300
1939	394	2,920
1940	554	4,152
1941	560	5,315
1942	612	4,142
1943	642	6,917
1944	988	4,321
1945	1,155	6,483
1946	352	6,348
1947	646	9,541
1948	883	8,950
1949	790	5,698
1950	813	8,795
1951	756	8,750*

* Iron Age estimate.

Source: U. S. Bureau of Mines

NICKEL IMPORTED INTO THE UNITED STATES

Short Tons, Nickel Imported for Consumption

	Ore and Matte	Pigs, Ingots, Shot, Bars, Rods, Tubes, etc.	Oxide	Nickel Silver	Gross Weight	Nickel Content*
1926	7,318	14,704	743	3	22,768	19,300
1927	5,372	14,610	507	8	20,497	17,900
1928	9,295	24,559	872	13	34,738	30,300
1929	14,491	32,355	1,638	7	48,488	41,500
1930	10,297	19,162	677	8	30,143	25,300
1931	5,815	11,817	152	5	17,789	15,100
1932	2,959	7,512	344	1	10,816	9,400
1933	9,610	15,811	1,010	.....	26,430	21,900
1934	5,923	22,900	475	.....	29,298	21,000
1935	7,962	29,429	456	.....	37,848	34,200
1936	11,597	40,269	1,275	.....	53,141	47,600
1937	12,543	40,615	1,022	.....	54,180	47,884
1938	7,290	21,978	278	.....	29,546	26,200
1939	14,217	49,763	816	.....	64,796	58,200
1940	17,445	70,530	4,493	.....	92,468	83,760
1941	39,948	74,993	9,189	1	124,130	106,182
1942	40,189	80,788	11,977	.....	132,954	114,275
1943	43,486	92,579	5,184	.....	141,249	122,492
1944	36,414	93,053	5,465	.....	134,932	118,293
1945	25,039	78,402	19,087	.....	122,528	107,433
1946	19,046	71,163	14,521	5	104,734	92,500
1947	14,636	58,687	15,074	11	88,408	80,718
1948	13,854	71,567	21,514	4	106,939	96,880
1949	11,128	72,348	12,242	.....	97,139	91,471
1950	11,135	69,199	16,306	31	96,641	91,281
1951	12,829	76,660	11,986	2	101,497	91,073

* Estimate by Bureau of Mines.

Source: U. S. Bureau of Mines

U. S. NICKEL CONSUMPTION

Short Tons, Excludes Scrap Recovery

	1949	1950	1951	1952†
Stainless steel	11,909	21,016	21,792	16,399
Alloy steel	13,474	17,777	16,425	11,510
Cast iron	3,396	4,881	3,715	2,670
Nonferrous alloys*	18,971	28,139	26,338	23,120
High temperature and resistance alloys	4,054	5,599	7,408	5,868
Anodes	13,810	17,424	5,984	5,157
Plating salts	724	736	281	250
Catalysts	497	1,188	1,384	1,086
Ceramics	149	302	248	114
Magnets	.....	.....	646	391
Other	1,340	1,958	2,195	3,568
Total	68,326	99,022	86,416	72,125

* Includes copper-nickel alloys, nickel silver, brass, bronze, beryllium, magnesium and aluminum alloys; and Monel, Inconel and malleable nickel.
† Nine months figures cover companies which consumed 95% of the total in 1951.

Source: U. S. Bureau of Mines

ELECTROLYTIC NICKEL

Cents Per Pound, New York, Duty Paid

1929 to Nov. 24, 1946	35.00
Nov. 25, 1946 to Dec. 31, 1947	37.67
Jan. 1, 1948 to July 21, 1948	36.56
July 22, 1948 to Dec. 31, 1948	36.56
Jan. 1, 1949 to Aug. 31, 1949	42.93
Sept. 1, 1949 to May 31, 1950	42.97
June 1, 1950 to Dec. 31, 1950	51.22
Dec. 13, 1950 to June 1, 1951	53.56
June 2, 1951 to Dec. 31, 1952	59.56

Cobalt Production Consumption and Prices . . . Monthly New York Lead and Tin Prices

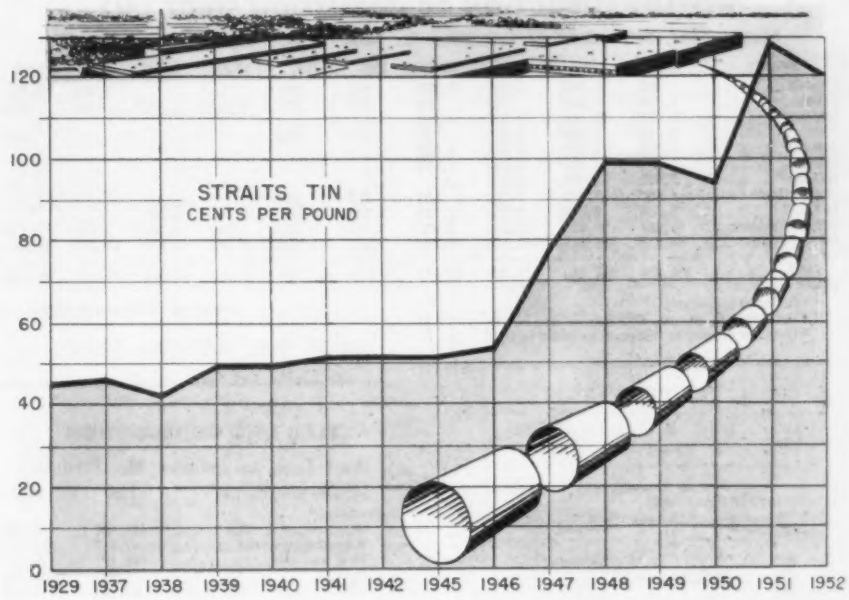
STRAITS TIN, PROMPT PRICE

Cents Per Pound, at New York

	1938	1939	1940	1941		1946
Jan.	41.54	46.39	48.73	50.16		52.00
Feb.	41.23	45.64	45.85	51.41		52.00
March	41.16	46.17	47.07	52.07		52.00
April	38.41	47.16	46.96	52.03	1945	52.00
May	36.83	49.00	51.51	52.18	1944	52.00
June	40.36	48.81	54.64	52.88	1943	52.00
					1942	
July	43.38	48.53	51.61	53.41	price	52.00
August	43.26	48.80	51.21	52.45	fixed	52.00
Sept.	43.40	Nom.	50.30	52.00	at	52.00
October	45.25	55.68	51.50	52.00	52.00	52.00
Nov.	46.29	52.65	50.57	52.00		61.00
Dec.	46.21	51.40	50.11	52.00		70.00
Average	42.28	49.11	49.84	52.03		54.00

	1947	1948	1949	1950	1951	1952
Jan.	70.00	94.00	$1.03	75.75	$1.72	$1.097
Feb.	70.00	94.00	$1.03	74.50	$1.83	$1.215
March	70.00	94.00	$1.03	75.62	$1.45	$1.215
April	80.00	94.00	$1.03	76.38	$1.46	$1.215
May	80.00	94.00	$1.03	77.50	$1.40	$1.215
June	80.00	$1.03	$1.03	77.70	$1.18	$1.215
July	80.00	$1.03	$1.03	89.88	$1.06	$1.215
August	80.00	$1.03	$1.03	$1.02	$1.03	$1.212
Sept.	80.00	$1.03	$1.02	$1.01	$1.03	$1.213
October	80.00	$1.03	95.49	$1.13	$1.03	$1.212
Nov.	80.00	$1.03	90.11	$1.38	$1.03	$1.213
Dec.	85.38	$1.03	79.06	$1.45	$1.03	$1.214*
Average	77.95	99.25	99.22	95.53	$1.27	$1.204*

* Tentative.



WORLD PRODUCTION OF COBALT

Metric Tons of Cobalt Contained in Mine Production of Ores

Country	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Australia	13	14	15	9	9	10	8	10	9	10	(2)
Belgian Congo	2,256	1,656	2,081	1,877	2,800	2,150	3,583	4,322	4,350	5,148	5,875
Bolivia (Exports)	2	(3)	(3)	....	....	....	....	....	....	(2)	(2)
Burma	73	....	....	....	....	....	....	....	....	....	....
Canada[1]	119	38	80	16	49	34	260	701	281	265	430
Chile	2	(3)	3	5	1	....	....	....	....	(2)	(2)
Finland	(2)	98	79	86	84	101	50	(2)	(2)	(2)	(2)
Italy	81	69	27	7	6	....	....	(3)	(3)	(2)	(2)
Japan	(3)	1	3	15	11	7	6	(3)	....	....	....
Morocco, French	65	3	216	243	98	188	212	221	209	420	680
Northern Rhodesia[4]	850	914	943	978	874	552	420	367	402	670	678
Sweden	....	....	....	....	9	....	....	....	(2)	(2)	(2)
United States (Shipments)	237	300	346	253	581	230	307	263	308	299	343
Total (Estimate)	4,000	3,500	4,200	3,900	4,700	3,500	5,000	6,100	5,900	7,100	8,500

In addition to countries listed, Brazil, China, Germany, and Spain produce cobalt, but production data are not available. Estimate included in total.

[1] Excludes cobalt recovered by Mond Nickel Co. at Clydach, Wales, from nickel copper ores of Sudbury, Ont. district.
[2] Data not available; estimate included in total.
[3] Less than 1 ton.
[4] Year ended June 30 of year stated.

Source: Bureau of Mines

CONSUMPTION OF COBALT IN UNITED STATES

Pounds of Cobalt Contained, Broken Down According to Use

	1947	1948	1949	1950	1951
Metallic:					
High-Speed Steel	223,148	289,391	283,496	235,227	316,064
Magnet Steel	121,223	165,698	42,965	37,552	58,652
Permanent Magnet Alloys	894,924	1,186,673	1,194,920	2,834,040	2,052,042
Other Steel	87,719	132,803	162,638	252,685	79,885
Cast Cobalt-Chromium-Tungsten-Molybdenum Alloys	941,087	1,196,608	1,238,083	2,226,199	4,899,591
Alloy Hard-Facing Rods and Materials	71,545	116,313	82,965	260,371	575,268
Cemented Carbides	51,917	85,314	118,522	136,935	297,751
Other	99,476	115,255	116,344	208,574	276,222
Total Metallic	2,491,039	3,288,055	3,239,933	6,191,783	8,555,475
Nonmetallic (Exclusive of Salts and Driers):					
Ground-Coat Frit	607,316	613,745	424,051	683,358	448,983
Pigments	207,928	232,725	188,606	262,441	50,073
Other	51,439	66,699	84,336	43,826	60,462
Total Nonmetallic	866,683	913,169	696,993	989,625	559,518
Salts and Driers: Lacquers, Varnishes, Paints, Inks, Pigments, Enamels, Glazes, Feed, Electroplating, etc. (Estimate)	797,000	818,000	765,000	1,102,000	818,000
Grand Total	4,154,722	5,019,224	4,701,926	8,283,408	9,932,993

Source: Bureau of Mines

COBALT, 97 TO 99 PCT.

Per Pound, 550 lb Lots Since 1947

1940 to June 30, 1947[1]	$1.50
July 1, 1947 to March 31, 1949	1.65
April 1, 1949 to December 31, 1950	1.80
January 2, 1951 to October 1, 1951	2.10
October 2, 1951 to December 31, 1952	2.40

[1] 100 lb lots.

A list of trade associations and technical societies in nonferrous and other fields begins on p. 470.

LEAD PRICE, COMMON GRADE

Cents Per Pound, at New York

	1938	1939	1940	1941		1948
Jan.	4.87	4.83	5.47	5.50		6.50
Feb.	4.83	4.80	5.08	5.60		6.50
March	4.50	4.82	5.19	5.77		6.50
April	4.50	4.78	5.07	5.85	1945	6.50
May	4.40	4.75	5.02	5.85	1944	6.50
June	4.15	4.80	5.00	5.85	1943	8.18
					1942	
July	4.88	4.85	5.00	5.85	price	9.18
August	4.90	5.04	4.85	5.85	fixed	8.25
Sept.	5.00	5.45	4.93	5.85	at	8.25
October	5.10	5.50	5.31	5.85	6.50	8.25
Nov.	5.09	5.50	5.73	5.85		10.41
Dec.	4.84	5.50	5.50	5.85		12.20
Average	4.74	5.05	5.18	5.79		8.10

	1947	1948	1949	1950	1951	1952
Jan.	13.00	15.00	21.50	12.00	17.00	19.00
Feb.	13.25	15.00	21.50	12.00	17.00	19.00
March	15.00	15.00	18.98	10.96	17.00	19.00
April	15.00	17.21	15.15	10.63	17.00	18.91
May	15.00	17.50	13.72	11.72	17.00	15.73
June	15.00	17.50	12.00	11.81	17.00	15.08
July	15.00	17.80	13.56	11.66	17.00	16.00
August	15.00	19.50	14.99	12.93	17.00	16.00
Sept.	15.00	19.50	15.05	15.80	17.00	16.00
October	15.00	19.50	13.42	16.00	18.93	14.40
Nov.	15.00	21.50	12.52	17.00	19.00	14.18
Dec.	15.00	21.50	12.00	17.00	19.00	*14.00
Average	14.69	18.04	15.37	13.29	17.49	*16.44

* Tentative.

2 NONFERROUS

Magnesium production and consumption . . .
Imports and consumption of zinc in the U. S.

WORLD PRODUCTION OF MAGNESIUM SINCE 1942

Metric Tons, Production or Estimates for Minor Producing Nations in Total

Country	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Canada	367	3,245	4,799	3,338	145	136	.....	.....	1,606	4,000
France	1,334	1,542	703	279	707	800	1,507	700[3]	446	875
Germany	30,000	32,400	33,600	4,225	.....	.....	17	.....	.....	.....
Italy	2,379	2,000[2]	3,000[2]	400[2]	1,000[2]	600[2]	.....	.....	.....	125
Japan	2,020	2,777	2,904	1,020	.....	.....	.....	.....	.....	.....
Korea	240	532	1,628	1,014	.....	.....	.....	.....	.....	.....
Norway[3]	2,000	2,000	2,000	.....	.....	.....	.....	.....	.....	120
Switzerland[3]	1,500	1,500	1,000	500	300	500[2]	.....	.....	.....	.....
U.S.S.R.[3]	5,000	5,000	5,000	2,170	3,000	4,000	5,000	5,000	.....	.....
United Kingdom	14,865	19,096	13,094	6,900[1]	1,700[1]	2,500[1]	3,500	5,100[1]	4,816[1]	7,700[1]
United States	44,418	166,544	142,518	29,748	4,823	11,198	9,075	10,521	14,267	37,087
Total	104,876	237,760	211,182	49,815	11,675	19,734	19,300	21,500	21,135	79,000

[1] Includes secondary.
[2] Estimated by Bureau of Mines.
[3] Data not available. Estimate included in total.

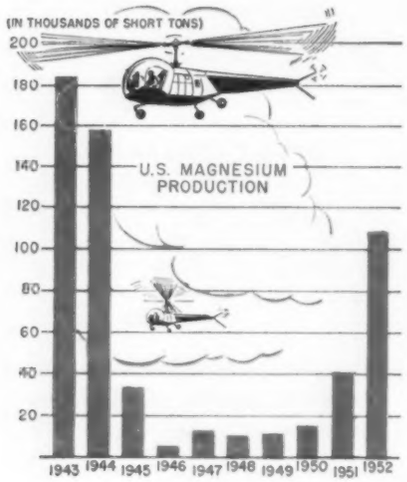
Source: U. S. Bureau of Mines

MAGNESIUM OUTPUT AND USE

Includes Secondary, Short Tons

	1951	1952
Primary ingot produced	40,881	105,386
Primary ingot sold and used by producer:		
For magnesium alloys	28,500	34,000
For aluminum alloys and other non-magnesium use	11,000	16,000
Total sold and used	39,500	50,000
Cast and wrought products shipped	30,300	33,000
Secondary magnesium:		
Used in magnesium alloys	6,300	4,000
Used in aluminum and non-magnesium industries	1,700	5,000
Total secondary used	8,000	9,000
Total consumption primary & secondary	47,500	59,000

Source: Estimated by Magnesium Assn.



SLAB ZINC CONSUMPTION

Short Tons, by Industry and Product

Industry and Product[1]	1950	1951
Galvanizing:[2]		
Sheet and strip	152,406	144,329
Wire and wire rope	47,317	51,792
Tube and pipe	91,877	79,221
Fittings	15,948	21,186
Other	98,138	103,751
Total	441,686	400,279
Brass products:		
Sheet strip and plate	68,737	67,815
Rod and wire	43,413	46,656
Tube	17,385	15,927
Castings and billets	4,170	7,698
Copper-base ingots	4,081	5,743
Other copper-base products	1,587	653
Total	139,373	143,292
Zinc-base alloy:		
Die castings	285,022	282,812
Alloy dies and rods	2,929	11,135
Slush and sand castings	1,576	2,487
Total	289,527	296,434
Rolled zinc	68,444	64,085
Zinc oxide	18,167	18,223
Other uses:		
Wet batteries	1,527	1,749
Desilverizing lead	2,947	2,186
Light-metal alloys	1,356	3,132
Other[3]	4,087	4,591
Total	9,917	11,658
Total: All uses	[4]967,134	[4]933,971

[1] Based on a canvass of approximately 700 plants.
[2] Includes zinc used in electrogalvanizing but excludes sherardizing.
[3] Includes zinc used in making zinc dust bronze powder alloys chemicals castings and miscellaneous uses not elsewhere mentioned.
[4] Includes 2,394 tons of remelt zinc in 1949 and 2,035 tons in 1950. 4,505 tons in 1951.

Source: Bureau of Mines

ZINC IMPORTS INTO U. S.

Short Tons, Imports for Consumption

	Ores, Concentrates (Zn content)	Blocks, Pigs, Slabs	Old, Dross, Skimmings
1929	.....	226	.....
1930	.....	281	98
1931	.....	274	.....
1932	.....	310	.....
1933	2,133*	1,890	.....
1934	14,277*	1,725	.....
1935	10,520*	4,444	29
1936	172*	11,660	16
1937	8,812*	37,208	670
1938	4,860	7,230	96
1939	33,503	30,960	283
1940	44,637	10,146	920
1941	154,520	40,288	458
1942	283,167	36,352	3,357
1943	516,646	56,155	5,148
1944	415,004	63,626	5,603
1945	330,397	96,710	7,331
1946	166,885	104,015	4,137
1947	194,822	72,063	5,105
1948	133,814	92,495	10,273
1949	109,575	125,564	3,722
1950	247,915	105,304	2,934
1951	239,488	87,983	6,602
1952†	560,714	65,995	2,583

* Includes entries under bond.
† Nine months.

Source: Bureau of Mines Department of Commerce and American Bureau of Metal Statistics

Nonferrous market reports and price quotations are a weekly Iron Age feature. "Review and Forecast," p. 273, also covers nonferrous metals.

MAGNESIUM CONSUMPTION

Short Tons, Primary Metal Only

Product	1948	1949	1950	1951
Structural products:				
Castings:				
Sand	1,930	3,088	3,090	10,179
Die	213	127	242	994
Permanent mold	12	44	573	646
Sheet	1,122	2,155	3,357	5,761
Extrusions	2,529	3,364	3,400	5,241
Forgings	103	200	104	735
Total structural	5,909	8,978	10,766	23,556
Other products:				
Powder	.....	.....	56	482
Aluminum alloys	2,324	1,759	3,722	5,994
Other alloys	43	39	255	401
Scavenger and deox.	418	404	473	1,332
Chemical	407	224	373	447
Cathodic protection	367	235	1,937	2,364
Other[1]	193	308	469	1,134
Total other products	3,752	2,969	7,285	12,154
Grand Total	9,661	11,947	18,051	35,710

[1] Includes primary metal consumed in making secondary alloy.

Source: Bureau of Mines

U. S. PRODUCTION OF PRIMARY MAGNESIUM

Short Tons, Excludes Crystal Equivalent of Mg Content of Fire Bombs in 1943, 1944

Month	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
January	2,512	10,300	20,056	3,816	98	1,398	883	988	1,002	1,876	7,425
February	2,337	10,666	19,537	2,958	48	1,232	830	884	913	1,709	7,794
March	2,591	13,008	19,571	3,297	10	1,472	887	988	948	1,885	8,883
April	2,506	13,558	17,986	3,174	.....	1,153	801	958	967	2,043	8,000
May	2,635	15,093	16,217	3,171	.....	926	797	987	972	2,194	9,083
June	2,631	15,077	13,750	3,404	241	848	786	950	1,175	2,512	8,670
July	3,299	16,584	14,134	4,586	692	905	792	985	1,132	2,998	9,529
August	3,426	17,160	11,561	4,500	889	849	809	970	1,400	3,418	9,771
September	4,120	16,199	8,296	2,063	986	886	819	974	1,635	4,166	8,422
October	5,838	18,011	7,370	1,017	1,000	912	873	941	1,690	5,147	9,989
November	7,953	18,374	5,301	715	558	870	814	969	1,760	6,043	9,000*
December	9,115	19,554	3,321	101	795	893	932	1,004	1,942	6,923	9,000*
Total	48,963	183,584	157,100	32,792	5,317	12,344	10,003	11,598	15,726	40,914	105,366*

Producers' reports to WPB, Jan. 1942 to Aug. 1945, thereafter to Bureau of Mines and Magnesium Assn.
* Estimate.

Magnesium prices and scrap recovery . . . Zinc prices and exports . . . Production, prices, imports and exports of cadmium.

2 NONFERROUS

MAGNESIUM, 99.8 PCT PLUS

Cents Per Pound, at Freeport, Tex.

1929	56.00	1937	30.00	1945	20.50
1930	48.00	1938	30.00	1946	20.50
1931	34.00	1939	27.00	1947	20.50
1932	29.00	1940	27.00	1948	20.50
1933	28.00	1941	27.00	1949	20.50
1934	26.00	1942	22.50	1950	22.02
1935	30.00	1943	20.50	1951	24.50
1936	30.00	1944	20.50	1952	24.50

RECOVERY OF SECONDARY MAGNESIUM IN U. S.

Short Tons, Broken Down by Form of Recovery, Since 1943

Form of Recovery	1943	1944	1945	1946	1947	1948	1949	1950	1951
Magnesium-Alloy Ingot[1] (Gross Weight)	11,009	13,379	7,359	2,506	5,138	4,713	4,249	3,249	5,657
Magnesium-Alloy Castings (Gross Weight)	327	235	496	1,145	1,377	1,301	681	2,504	1,675
Magnesium-Alloy Shapes	.....	.....	864	136	85	1	96	281	25
In Aluminum Alloys	34	23	274	1,218	1,883	998	294	810	1,091
In Zinc Alloys	1	5	3	4	3	6	4	57	55
In Other Alloys	.....	2	10	2	.....	.....	.....	.....	.....
Chemical and Incendiary Uses	33	541	241	106	199	84	83	95	101
Cathodic Protection	.....	.....	.....	.....	818	450	555	311	615
	11,404	14,185	9,247	5,117	9,503	7,553	5,962	7,307	9,219

[1] Figures include secondary magnesium incorporated in primary magnesium ingot. Source: U. S. Bureau of Mines

ZINC EXPORTS FROM U. S.

Short Tons, Ore and Manufactures

	Ore Concentrates Dross	Slabs Pigs Blocks	Sheet Strip, Plates	Dust
1929	3,561	14,411	5,265	1,256
1930	1,162	4,633	3,868	1,177
1931	395	643	2,759	1,400
1932	178	8,471	3,010	1,378
1933	809	1,145	3,189	1,569
1934	3,452	5,105	3,462	1,658
1935	461	1,617	4,813	1,613
1936	245	37	4,483	1,793
1937	314	249	5,813	2,145
1938	135	(1)	5,736	2,253
1939	303	4,515	6,708	2,384
1940	448	79,091	7,490	3,044
1941	.....	89,309	5,246	2,901
1942	.....	133,981	4,767	1,772
1943	.....	97,439	3,167	5,869
1944	.....	21,576	4,020	295
1945	.....	7,782	6,235	330
1946	89	37,431	13,848	366
1947	1,404	108,689	10,898	1,646
1948	3,547	65,537	7,344	891
1949	4,495	58,709	7,458	690
1950	7,352	12,917	4,810	506
1951	3,090	36,509	4,868	723
1952*	2,546	40,189	1,851	.....

* Nine months.

Source: U. S. Bureau of Mines

CADMIUM PRICES, STICKS, BARS

Dollars Per Pound, 1 to 5-Ton Lots

June 3, 1943 to July 17, 1946	$0.90
July 18, 1946 to November 20, 1946	1.25
November 21, 1946 to December 4, 1946	1.37½
December 5, 1946 to February 19, 1947	1.50
February 20, 1947 to August 11, 1948	1.75
August 12, 1948 to November 17, 1948	1.90
November 18, 1948 to June 14, 1950	2.00
June 15, 1950 to September 10, 1950	2.15
September 11, 1950 to November 30, 1950	2.40
December 2, 1950 to May 26, 1952	2.55
May 27, 1952 to August 5, 1952	2.25
August 6, 1952 to November 30, 1952	2.00
December 1, 1952 to December 31, 1952	1.50–2.00

U. S. CADMIUM PRODUCTION

Short Tons of Contained Cadmium

	Metallic Cadmium	Compounds	Secondary Recovery
1932	400	130	...
1933	1,138	201	...
1934	1,389	283	...
1935	1,739	254	...
1936	1,817	313	...
1937	2,133	414	...
1938	2,039	216	...
1939	2,206	340	...
1940	2,961	423	114
1941	3,469	148	190
1942	3,662	24	158
1943	4,196	35	31
1944	4,227	163	53
1945	3,966	226	36
1946	3,100	135	178
1947	4,004	250	52
1948	3,791	96	61
1949	4,012	102	192
1950	4,425	170	214
1951	4,057	99	84

Source: U. S Bureau of Mines

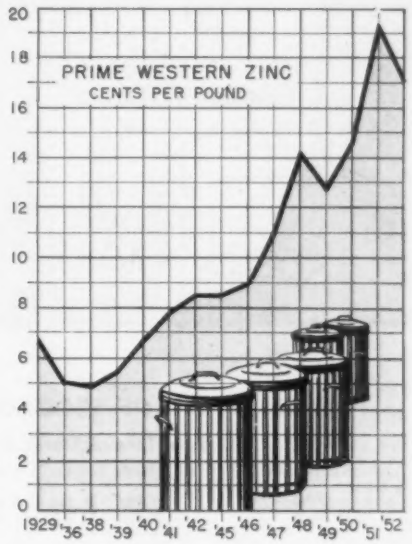
PRIME WESTERN ZINC PRICE

Cents Per Pound, at New York

	1938	1939	1940	1941		1949
Jan.	5.35	4.89	6.03	7.65		8.85
Feb.	5.17	4.89	5.93	7.95		8.65
March	4.77	4.89	6.14	7.85		8.66
April	4.53	4.89	6.14	7.65	1945	8.65
May	4.43	4.89	6.20	7.65	1944	8.65
June	4.53	4.89	6.63	7.65	1943	8.65
					1942	
July	5.14	4.91	6.54	7.65	price	8.69
August	5.14	5.11	6.79	7.65	fixed	8.69
Sept.	5.24	6.51	7.33	7.65	at	8.69
October	5.40	6.89	7.65	8.36	8.65	9.28
Nov.	5.12	6.89	7.64	8.65		10.86
Dec.	4.89	6.46	7.65	8.65		10.94
Average	4.98	5.51	6.73	7.88		9.09

	1947	1948	1949	1950	1951	1952
Jan.	11.005	11.69	18.18	9.48	18.22	20.29
Feb.	11.005	12.61	18.20	10.47	18.22	20.29
March	11.005	12.61	17.76	10.66	18.22	20.29
April	11.005	12.61	14.76	11.41	18.25	20.29
May	11.005	12.64	12.58	12.71	18.25	20.33
June	11.005	12.65	10.27	15.49	18.25	16.57
July	11.005	13.09	10.06	15.72	18.25	15.83
August	11.005	15.65	10.70	15.72	18.26	14.88
Sept.	11.005	15.65	10.77	17.82	18.29	14.86
October	11.03	15.74	10.04	18.22	20.22	14.08
Nov.	11.06	17.27	10.46	18.22	20.29	13.33
Dec.	11.06	18.15	10.47	18.22	20.29	*13.33
Average	11.02	14.20	12.85	14.51	18.75	*17.03

* Tentative



See Section 5 for data on various nonferrous castings and prices and production of nonferrous powders. . . . It also contains an analysis of jet engine alloys.

U. S. CADMIUM EXPORTS

Gross Weight in Pounds, 1950-1952

Kind	1950	1951	1952*
Dross flue dust residues scrap	.....	200,579	296,060
Metal	352,927	606,233	
Alloys	9,000	5,639	
Total	361,927	812,451	296,060

* Nine months

Source: Bureau of Mines

CADMIUM IMPORTED INTO THE UNITED STATES

Metal in Pounds, Flue Dust and Total 000 Omitted*, Imports for Consumption

	1945	1946	1947	1948	1949	1950	1951	1952 (9 months)
Metallic Cadmium:								
Australia	.....	.....	.....	.....	7,210	7,918	9,627	.....
Belgian Congo	25,798	6,700	.....	.....	.....	.....	.....	.....
Belgium and Luxembourg	...	2,240	2,000	...	48,503	143,825	52,870	461,462
Canada	672	3,568	14,612	6,300	68,140	237,494	3,336	.....
Italy	.....	.....	.....	.....	.....	4,400	.....	.....
Germany	.....	.....	.....	.....	.....	.....	.....	5,512
Netherlands	.....	.....	.....	.....	.....	.....	5,402	.....
Japan	.....	.....	.....	.....	31,640	194,745	18,808	203,071
Peru	2,254	4,907	3,658	3,509	1,711	3,010	.....	.....
United Kingdom	.....	.....	20	.....	.....	1,008	.....	.....
Total	28,724	17,415	20,292	9,809	157,204	592,400	90,065	670,045
Flue Dust:								
Australia	.....	.....	.....	821	.....	.....	.....	.....
Brazil	.....	.....	.....	.....	2,906	.....	.....	.....
Canada	.....	.....	.....	.....	.....	.....	.....	3
Mexico	2,193	1,609	2,356	1,827	1,786	1,507	1,605	1,491
Peru	.....	.....	.....	.....	.....	.....	.....	.....
Total Metallic Cadmium and Flue Dust	2,221	1,670	2,376	2,458	4,849	2,099	1,695	2,168

Source: U. S. Dept. of Commerce

2 NONFERROUS

Molybdenum, vanadium and mercury output . . . scrap lead recovery . . . Nonferrous industry employment, hours and earnings

WORLD PRODUCTION OF MOLYBDENUM, FROM 1941

Metric Tons of Ores and Concentrates, Molybdenum From Other Nations in Total[1]

Country[1]	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Canada	47	43	178	509	228	184	207	79	.....	28	95
Chile	229	580	680	1,051	841	560	402	532	558	965	2,500
China: Manchuria[2]	75	384	516	516	30	.....	.....	.....	.....	(3)	(3)
Finland	148	126	108	110	92	99	.....	.....	.....	.....	(3)
Japan	41	56	87	189	108	52	18	1	.....	13	43
Korea, South	122	217	291	394	54	.....	5	2	11	(3)	(3)
Mexico	522	855	1,138	717	468	818	136	.....	.....	.....	.....
Norway	229	368	227	248	76	10	103	79	70	62	119
Peru	146	154	85	62	29	4	3	3	2	1	3
United States	18,309	25,829	27,972	17,545	13,972	8,264	12,268	12,114	10,219	12,918	17,625
Total	20,300	29,000	31,400	21,400	15,900	10,800	14,000	13,600	11,500	14,400	21,000

[1] Molybdenum is also produced in Greece, Rumania, Turkey, U. S. S. R., and Yugoslavia, but production data are not available.
[2] Exports to Japan proper. [3] Not available.
Source: U. S. Bureau of Mines

U. S. MOLYBDENUM OUTPUT

Short Tons of Contained Molybdenum

1926	697	1940	17,157
1927	1,150	1941	20,102
1928	1,714	1942	28,471
1929	2,011	1943	30,834
1930	1,862	1944	19,340
1931	1,567	1945	15,401
1932	1,216	1946	9,108
1933	2,841	1947	13,524
1934	4,681	1948	13,333
1935	5,756	1949	11,265
1936	8,593	1950	14,240
1937	14,718	1951	19,420
1938	16,648	1952 (First Half)	9,579
1939	15,162		

Source: U. S. Bureau of Mines

U. S. MERCURY STATISTICS

Flasks of 76 Pounds, Imports General

	1949	1950	1951
Production (Includes Scrap)	9,930	4,535	7,293
Imports	96,918	60,564	44,925
Exports	577	447	241
Consumption	39,857	49,215	56,848
Average Price	$79.46	$81.26	$210.13

Source: U. S. Bureau of Mines

WORLD PRODUCTION OF VANADIUM

Metric Tons, Total Excludes Russia, French Morocco and Spain, also Byproduct

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Argentina	1	6	....	....	4	3	6	7	(1)	(1)	(1)	(1)
Mexico	32	(2)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Rhodesia	368	342	388	426	254	219	68	56	173	153	.....	87
Peru	1,214	1,017	1,010	847	514	688	322	435	511	456	436	*400
South-West Africa	428	269	453	577	385	420	430	282	187	163	295	*300
U. S. (shipments)[3]	981	1,140	2,014	2,534	1,600	1,344	577	961	(4)	(4)	(4)	(4)
Total[5]	3,024	2,774	3,885	4,384	2,757	2,674	1,403	1,741	(4)	(4)	(4)	(4)

[1] Figure not available. [2] Less than 1 ton. [3] Includes also vanadium recovered as a byproduct of phosphate-rock mining.
[4] Bureau of Mines not at liberty to publish figure. [5] Total represents data only for countries shown in table.
* Est.
Source: U. S. Bureau of Mines

RECOVERY OF SECONDARY LEAD IN THE U. S.

Short Tons of Metal, Showing Form of Recovery

Form of Recovery	1943	1944	1945	1946	1947	1948	1949	1950	1951
As Metal:									
At Primary Plants	21,634	11,368	18,525	8,013	15,662	4,952	23,230	5,455	3,893
At Other Plants	36,688	43,678	42,598	65,691	95,843	126,951	129,396	123,858	165,023
	58,322	55,046	61,123	73,704	111,505	131,903	152,626	129,313	168,916
In Antimonial Lead[1]	176,076	180,818	194,079	193,684	265,935	243,552	172,742	225,640	229,963
In Other Lead Alloys	76,474	68,271	77,051	94,653	103,799	102,603	78,894	107,635	95,516
In Copper-Base Alloys	28,625	26,667	30,346	30,101	30,137	21,449	7,440	18,695	23,044
In Tin-Base Alloys	1,746	614	440	645	594	514	481	992	671
	341,243	331,416	363,039	392,787	511,970	500,071	412,183	482,275	518,110

[1] Includes lead recovered in secondary antimonial lead at primary plants.
Source: U. S. Bureau of Mines

EMPLOYMENT, HOURS, EARNINGS

Nonferrous Metal Finishing*

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$57.81	40.2	$1.438	86.0	103.8
1949	58.05	38.7	1.500	70.6	87.0
1950	66.75	41.9	1.593	80.7	96.9
1951	68.70	40.7	1.688	82.2	100.3
1952:					
Jan.	71.54	41.4	1.728	81.7	99.9
Feb.	70.21	40.7	1.725	80.5	98.3
Mar.	70.74	40.7	1.738	81.9	100.5
Apr.	69.85	40.4	1.729	82.0	100.5
May	70.47	40.5	1.740	81.7	100.6
June	70.91	40.8	1.738	79.8	98.9
July	72.95	41.4	1.762	76.5	95.2
Aug.	76.94	42.0	1.832	81.0	100.2

* Rolling, drawing, and alloying.
Source: Bureau of Labor Statistics

EMPLOYMENT, HOURS, EARNINGS

Nonferrous Metal Manufacturing*

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$58.22	41.0	$1.420	46.8	55.6
1949	60.36	40.4	1.494	43.3	52.3
1950	63.71	41.0	1.554	45.4	54.6
1951	70.13	41.4	1.694	47.2	56.3
1952:					
Jan.	73.54	41.5	1.772	47.2	56.4
Feb.	73.17	41.6	1.759	47.8	57.3
Mar.	74.03	41.8	1.771	47.4	56.8
Apr.	73.33	41.5	1.767	47.6	57.0
May	74.41	41.9	1.776	47.8	57.2
June	74.52	41.7	1.787	47.8	57.3
July	75.07	41.5	1.809	47.2	57.2
Aug.	74.23	41.4	1.793	47.7	57.8

* Primary metal industries group, primary smelting and refining.
Source: Bureau of Labor Statistics

WORLD PRODUCTION OF MERCURY

Number of 76 Pound Flasks, Estimated Production of Other Nations Is in Total

Country[1]	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Algeria	121	146	165	326	340	346	381	102	(2)	(2)
Canada	13,630	22,240	9,682	.....	.....	.....	.....	.....	.....	.....
Chile	2,256	2,563	1,181	862	827	445	467	754	319	(3)
China	4,293	3,133	3,510	1,828	1,189	290	290	290	1,450	4,000
Czechoslovakia	(2)	(2)	(2)	(2)	841	788	800	800	(2)	(2)
Germany	493	3,480	3,480	(2)	.....	(2)	(2)	(2)	(2)	(2)
Italy	375,921	358,004	328,704	325,410	50,822	53,984	38,233	44,527	53,346	53,539
Japan	5,197	6,706	7,096	3,139	1,372	1,622	1,689	2,461	1,312	1,847
Mexico	32,443	28,321	26,063	16,443	11,661	9,700	4,786	5,250	3,713	8,093
Peru	145	326	152	209	5	.....	.....	.....	(2)	(2)
Spain	72,268	47,756	34,349	40,694	41,801	55,608	22,684	32,289	51,800	44,480
Turkey	271	186	97	158	.....	98	27	.....	.....	(2)
Union of South Africa	579	1,189	1,192	852	764	.....	.....	.....	.....	7,293
United States	50,846	51,929	37,688	30,763	25,348	23,244	14,388	9,930	4,535	14,649
Yugoslavia	(3)	(3)	(3)	(3)	8,876	9,457	10,936	12,764	14,368	14,649
Total	265,000	236,000	163,000	131,000	154,000	168,000	107,000	121,000	143,000	148,000

[1] Mercury is also produced in Korea (Chosen) and U. S. S. R., but production data are not available; estimates included in the total. Totals include output or estimates for minor producing nations, including Australia, Austria, Bolivia, New Zealand, Rumania, Southern Rhodesia, Sweden and Tunisia.
[2] Data not available; estimates included in the total.
[3] Output of Idria mine (Yugoslavia) included with Italy through 1945.
Source: U. S. Bureau of Mines

The Iron Age

METAL INDUSTRY FACTS

SECTION 3

RAW MATERIALS

PIG IRON • ORE • COAL • SCRAP • FERROALLOYS

IN THIS SECTION:

BLAST FURNACES

Page

- Canadian statistics 427
- Capacity 426
- Coke receipts 433
- Consumption of materials 426
- No. of in U. S. 426

BRICKS, REFRACTORY 436

CANADIAN STATISTICS ... 427

CHROMITE 435

COAL

- Consumption 432
- Exports 432
- Production 432

COKE 433

CONSUMPTION

- Blast furnace materials 426
- Coal 432
- Coke, blast furnace 433
- Iron ore 429
- Scrap 432

EMPLOYMENT

- Hours, earnings, rates
  - Coal 431
- Iron mining 430

EXPORTS

- Coal 432
- Coke 433
- Pig iron 426

FERROMANGANESE ...435, 436

FERROSILICON 435, 436

IMPORTS

- Chromite 435
- Coke 433
- Ferrosilicon 436
- Manganese 434
- Pig iron 426

INVENTORIES, SCRAP 431

IRON ORE

Page

- Analyses, Grades 429
- Consumption, U. S. 429
- Prices 429
- Production 430
- Shipments 429

MANGANESE 434

MANGANIFEROUS ORES ... 434

PIG IRON

- Canadian 427
- Capacity 427
- Exports 426
- Imports 426
- Prices 428, 429
- Production 426, 427

PRICES

- Brick, refractory 436
- Coke 433
- Ferromanganese, 80 pct 435
- Ferrosilicon, 50 pct 435
- Iron ore 429
- Pig iron 428, 429

Page

- Scrap 431, 432
- Spiegeleisen, 19 to 21 pct 435

PRODUCTION

- Canadian pig iron 427
- Chromite 435
- Coal 432
- Coke 433
- Ferrosilicon 436
- Iron ore 430
- Manganese ore 434
- Pig iron 426, 427
- Spiegeleisen 436

SCRAP

- Composite price 432
- Consumption 432

SHIPMENTS

- Chromite ore 435
- Ferromanganese 436
- Iron ore 429
- Manganiferous ores 434
- Manganese ores 434

SPIEGELEISEN 435, 436

3 RAW MATERIALS

Pig iron: World production, U. S. imports and exports . . . U. S. blast furnace capacity. Blast furnaces by states . . . Materials used.

WORLD PRODUCTION OF PIG IRON

(Net Tons in Thousands)

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952*
United States	47,399	56,687	60,903	62,770	62,866	54,919	46,515	60,117	61,912	54,206	64,810	71,233	62,097
Canada	1,448	1,708	2,156	1,930	2,012	1,976	1,525	2,152	2,335	2,367	2,491	2,553	2,973
United Kingdom	9,189	8,280	8,653	8,049	7,545	7,960	8,692	8,457	10,389	10,637	10,706	10,829	12,070
Belgium	1,976	1,572	1,398	1,801	780	802	2,393	3,109	4,346	4,130	4,072	5,343	5,236
Brazil	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	851	793
India	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,039	2,033
Luxembourg	1,164	1,481	1,865	2,526	1,481	344	1,505	2,004	2,896	2,615	2,755	3,480	3,400
France	4,060	3,694	4,231	5,424	3,189	1,304	3,796	5,383	7,248	9,188	8,562	9,645	10,678
Netherlands	305	.....	.....	.....	.....	.....	128	180	487	478	500	577	983
Hungary	471	487	460	460	326	1	176	330	336	.....	.....	660*	.....
Germany†	15,383	17,012	17,021	17,606	14,737	1,550	2,425	2,491	6,394	7,870	10,440	.....	.....
Western Germany	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,791	14,104
Eastern Germany	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	380	843
Saar	2,008	2,258	2,224	2,411	1,634	.....	271	721	1,252	1,743	1,854	2,612	2,800
Austria	.....	.....	.....	.....	.....	.....	64	306	679	924	973	1,157	1,296
Czechoslovakia	1,786	1,733	1,759	1,878	1,746	635	1,058	1,569	1,822	.....	.....	2,380*	.....
Poland	.....	.....	.....	290	271	252	800	944	1,199	.....	.....	1,740*	.....
Yugoslavia	92	83	.....	.....	.....	.....	.....	.....	.....	211	225	273	281
Rumania	150	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	390	.....
Russia	16,500	14,300	7,700	11,100	16,800	10,140*	11,250*	12,450*	15,750*	18,960*	19,500*	24,400*	27,500*
Italy	1,239	1,229	1,077	802	341	83	226	425	580	490	632	1,050	1,232
Spain	639	581	592	643	607	519	540	551	562	693	724	716	812
South Africa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	867	1,189
Sweden	868	814	837	874	941	839	771	779	861	948	855	938	1,102
Japan‡	4,422	5,268	5,475	5,089	3,434	556	202	391	922	1,767	2,557	3,447	3,872
Australia	1,357	1,653	1,745	1,466	1,462	1,252	1,204	1,329	1,384	1,171	1,473	1,496	1,678
Others	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,256	1,021
Total	110,455	118,847	118,095	125,121	120,171	83,132	83,541	103,687	121,354	118,398	122,904	162,103	157,283

Includes ferroalloys made in the blast furnace.
* Estimate.
† 1948, 1949 and 1950 figures do not include production in the Russian Zone. Saar and Austria are not included.
‡ Home islands, Korea and Manchuria in 1944 and previous years.

Source: American Iron and Steel Institute, Statistical Office of the United Nations and British Iron and Steel Federation

PIG IRON EXPORTS FROM THE UNITED STATES

Ranging from 1942 Through First 7 Months of 1952; in Short Tons

	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952*
Argentina	336	.....	431	5,659	4,772	125	.....	.....	.....	.....	.....
Australia	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,538	.....
Belgium & Luxembourg	.....	.....	.....	7,790	.....	29,262	.....	.....	.....	.....	.....
Canada	1,691	7,673	8,984	6,106	11,789	9,524	6,520	19,164	4,829	2,247	472
Chile	578	1,229	2,331	.....	.....	.....	.....	863	155	.....	.....
China	.....	.....	.....	.....	12,155	.....	.....	.....	.....	.....	.....
Colombia	.....	148	2,887	.....	.....	.....	.....	242	461	.....	.....
Costa Rica	.....	.....	.....	.....	.....	.....	.....	28	.....	.....	.....
Cuba	.....	.....	.....	.....	.....	.....	.....	111	135	156	.....
Dominican Republic	.....	.....	.....	.....	.....	.....	.....	182	140	.....	.....
Ecuador	.....	.....	.....	.....	.....	.....	.....	129	.....	.....	.....
France	.....	.....	.....	14,000	14,000	.....	.....	.....	.....	.....	.....
Greece	.....	.....	.....	.....	.....	.....	.....	1,690	46	45	.....
Italy	.....	.....	.....	10,643	16,856	.....	.....	.....	.....	.....	.....
Korea	.....	.....	.....	.....	.....	.....	.....	8,346	.....	.....	.....
Mexico	.....	.....	.....	.....	.....	.....	.....	2,280	660	1,422	766
New Zealand	.....	.....	.....	.....	.....	.....	.....	175	112	.....	.....
Nicaragua	.....	.....	.....	.....	.....	.....	.....	56	.....	56	.....
Paraguay	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....
Peru	.....	.....	.....	.....	.....	.....	.....	580	2	.....	.....
Philippines	.....	.....	.....	.....	.....	.....	.....	223	205	70	.....
Sweden	.....	.....	.....	22,066	24,082	.....	.....	.....	.....	.....	.....
Trinidad & Tobago	.....	.....	.....	.....	.....	.....	.....	11	.....	.....	.....
United Kingdom	105,495	121,534	132,001	1,524	.....	.....	.....	46,990	78	.....	200
Uruguay	.....	2,557	1,202	3,078	3,366	.....	.....	235	.....	.....	.....
U.S.S.R.	430	3,729	4,036	.....	.....	.....	.....	.....	.....	.....	.....
Other Countries	3,125	7,685	9,664	23,180	12,044	1,290	512	.....	.....	21	1,365
Total	111,655	144,555	161,536	94,046	99,064	40,201	7,032	81,310	6,813	6,555	2,803

* Seven Months.

Source: U.S. Department of Commerce and American Iron and Steel Institute

U. S. IMPORTS OF PIG IRON

Ranging from 1943 Through First 9 Months of 1952; in Long Tons

	1943†	1944	1945	1946	1947	1948	1949	1950	1951	1952*
Netherlands	.....	.....	.....	.....	2,710	45,020	20,527	209,698	88,512	11,270
Belgium	.....	.....	.....	.....	.....	32,809	15,688	7,220	14,726	2,719
Australia	336	.....	.....	.....	.....	26,901	19,599	.....	.....	.....
Germany	.....	.....	.....	.....	.....	24,558	2,382	190,710	293,005	13,738
Norway	.....	.....	.....	.....	9,482	23,920	145	1,025	1,859	200
Austria	.....	.....	.....	.....	281	18,594	5,145	50,566	73,775	9,855
France	.....	.....	.....	.....	.....	17,876	340	33,509	32,074	306
India	500	.....	.....	.....	.....	16,100	23,078	6,400	30,498	.....
Canada	49	5,778	21,433	1,287	1,747	5,729	12,270	142,467	182,866	191,088
Italy	.....	.....	.....	.....	.....	5,001	.....	.....	110	1
United Kingdom	560	.....	.....	1,528	.....	.....	193	2,465	3,533	.....
French Morocco	165	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexico	.....	.....	.....	11,248	.....	.....	.....	.....	.....	.....
Other Countries	.....	.....	.....	28	18,404	2,192	435	.....	193,364	25,876
Total	1,610	5,778	21,433	14,091	32,624	218,700	99,802	662,274	914,321	255,151

* Nine months. † No imports for 1942.

Source: U. S. Department of Commerce

BLAST FURNACES IN THE U. S.

Producing pig iron, ferroalloys

Massachusetts	1	Texas	3
New York	16	Ohio	30
Pennsylvania	77	Indiana	22
Maryland	8	Illinois	22
Virginia	1	Michigan	6
West Virginia	4	Minnesota	3
Kentucky	3	Colorado	4
Tennessee	3	Utah	5
Alabama	21	California	2
		Total	247

Capacity on tonnage basis, as of Jan. 1, 1952 was 73,782,340 net tons.

Source: American Iron & Steel Institute

BLAST FURNACE MATERIALS

Net Tons Used in 1951 for pig iron

Iron Ore	121,194,334
Scrap*	3,814,786
Mill Cinder, Scale, etc.	7,134,874
Total	132,143,994

* Scrap used less scrap produced.

Source: American Iron & Steel Institute

BLAST FURNACE CAPACITY*

Net Ton Totals for Active Units

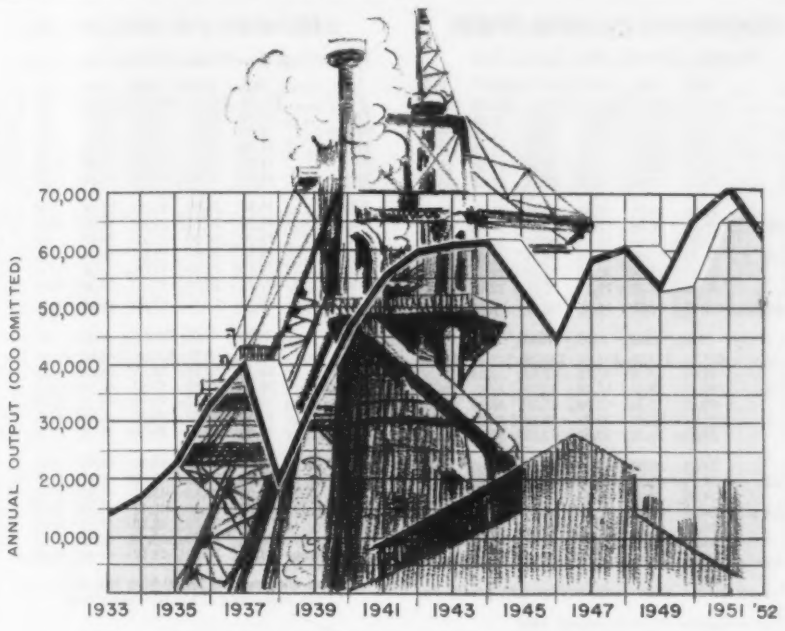
	Pig Iron	Ferro-alloys	Charcoal Iron	Total
1939	55,162,374	1,060,416	103,040	56,325,830
1940	54,635,740	992,320	95,580	55,723,640
1941	56,522,370	980,660	106,560	57,609,590
1942	59,211,850	1,075,570	106,560	60,393,980
1943	62,859,330	967,000	107,200	63,933,530
1944	66,344,780	990,300	56,190	67,391,270
1945	66,256,810	992,600	64,480	67,313,890
1946	66,311,410	996,700	32,480	67,340,590
1947	64,674,020	1,002,700	32,480	65,709,200
1948	66,301,610	1,097,000	40,320	67,438,930
1949	69,435,130	1,066,400	40,320	70,541,850
1950	70,348,920	1,108,300	40,320	71,497,540
1951	71,373,380	1,098,400	.....	72,471,780
1952	72,700,940	1,081,400	.....	73,782,340

* Capacities are for year beginning Jan. 1. Capacities of furnaces long idle not included. 1939-1950 includes charcoal iron.

Source: American Iron & Steel Institute

Pig iron: U. S. production of pig iron . . . Output by states . . . Canadian blast furnace production and pig iron capacity.

3 RAW MATERIALS



UNITED STATES PIG IRON PRODUCTION

Blast Furnace, Thousands of Net Tons, Includes Ferroalloys, Not Charcoal Iron

	Jan.	Feb.	Mar.	April	May	June	First Half	July	Aug.	Sept.	Oct.	Nov.	Dec.	Second Half	Year
1919	2922	2685	2932	2782	2677	2537	16,535	2407	2360	2303	2344	2139	1991	13,544	30,079
1920	3377	3337	3781	3068	3344	3409	20,316	3435	3525	3504	3688	3287	3029	20,468	40,784
1921	2705	2189	1788	1336	1368	1193	10,559	989	1069	1104	1396	1585	1847	7,970	18,529
1922	1842	1826	2280	2321	2583	2644	13,496	2694	2034	2278	2956	3191	3457	16,610	30,106
1923	3617	3353	3947	3978	4332	4117	23,342	4119	3884	3501	3527	3241	3272	21,524	44,866
1924	3382	3441	3883	3622	2929	2289	19,526	1989	2114	2299	2774	2811	3318	15,315	34,841
1925	3774	3600	3992	3650	3283	2995	21,294	2984	3030	3052	3386	3386	3640	19,478	40,772
1926	3714	3274	3855	3864	3900	3623	22,230	3610	3586	3512	3734	3626	3461	21,529	43,759
1927	3477	3294	3901	3832	3798	3461	21,763	3305	3300	3108	3118	2986	3020	18,817	40,580
1928	3214	3248	3585	3567	3678	3452	20,744	3441	3514	3429	3779	3698	3774	21,635	42,379
1929	3855	3591	4160	4102	4368	4163	24,237	4239	4218	3918	4019	3583	3177	23,133	47,360
1930	3166	3180	3636	3564	3620	3286	20,452	2956	2827	2550	2425	2092	1866	14,716	35,168
1931	1920	1912	2276	2261	2233	1836	12,438	1639	1435	1309	1314	1235	1098	8,030	20,468
1932	1089	1080	1084	954	877	704	5,788	640	582	663	721	707	612	3,925	9,713
1933	637	621	607	699	993	1417	4,974	2007	2063	1705	1519	1215	1323	9,822	14,796
1934	1361	1416	1813	1934	2288	2182	10,974	1372	1181	1006	1065	1072	1151	6,847	17,821
1935	1654	1802	1983	1883	1934	1739	10,975	1702	1972	1990	2215	2315	2360	12,554	23,529
1936	2269	2042	2285	2693	2966	2896	15,151	2905	3037	3058	3351	3301	3489	19,141	34,292
1937	3597	3359	3875	3799	3961	3481	22,072	3919	4039	3819	3239	2248	1689	18,933	41,005
1938	1601	1454	1627	1541	1406	1189	8,818	1346	1673	1882	2298	2543	2476	12,218	21,036
1939	2436	2307	2682	2303	1924	2373	14,025	2639	2979	3224	4063	4167	4220	21,292	35,317
1940	4032	3311	3270	3137	3514	3819	21,083	4054	4238	4177	4446	4403	4548	25,866	46,949
1941	4684	4198	4704	4334	4800	4553	27,053	4771	4791	4717	4856	4703	5012	28,850	55,903
1942	4971	4500	5055	4896	5073	4935	29,430	5051	5009	4937	5237	4968	5201	30,552	59,982
1943	5137	4766	5314	5035	5178	4836	30,343	5023	5316	5226	5324	5096	5213	31,434	61,777
1944	5283	5091	5442	5251	5351	5064	31,482	5157	5210	4988	5200	4904	4998	30,457	61,939
1945	4945	4563	5228	4786	5016	4605	29,142	4801	4249	4227	3388	4028	4323	25,025	54,167
1946	2645	1148	4424	3614	2275	3682	17,807	4705	4898	4687	4815	4435	3992	27,572	45,379
1947	5071	4560	5123	4830	5081	4810	29,480	4585	4917	4801	5228	5015	5177	29,723	59,209
1948	5196	4838	5019	3840	5077	4990	28,961	4899	5254	5207	5520	5399	5958	31,888	60,849
1949	5725	5223	5820	5531	5517	4819	32,642	4173	4477	4350	612	2721	5231	21,564	54,206
1950	5294	4173	4601	5577	5855	5633	31,133	5879	5770	5697	5924	5331	5828	34,229	64,910
1951	5829	5118	5946	5829	6118	5920	34,751	6010	6005	5827	6132	5843	5913	35,730	70,481
1952	5979	5723	6241	5185	6492	1056	30,676	996	5782	6096	6515	*6261	*6475	32,125	62,801

* Preliminary figure, subject to revision. Source: 1910 to 1942, THE IRON AGE; October 1942 to 1951, AISI.

PIG IRON PRODUCTION BY STATES

In U. S., Short Tons in Thousands, Includes 17 Major Producing States

	1946	1947	1948	1949	1950	1951
Pennsylvania	13,251	17,563	17,742	15,037	18,239	20,221
Ohio	9,534	12,317	12,471	10,640	12,510	13,170
Indiana	4,829	6,401	6,493	5,991	7,018	7,756
Illinois	4,357	5,600	5,513	4,913	6,024	6,566
Maryland, West Virginia	2,949	3,662	4,240	4,383	5,203	5,339
Alabama	3,149	3,929	4,013	3,663	4,347	4,371
Massachusetts, New York	2,780	3,869	3,875	3,541	4,301	4,699
Colorado, Utah, California	1,381	2,245	2,379	2,154	2,653	3,112
Michigan, Minnesota	1,893	1,924	2,101	2,002	2,829	2,904
Kentucky, Tennessee, Texas	556	818	1,228	1,089	1,459	1,598

Source: American Iron & Steel Institute

CANADIAN STATISTICS

PIG IRON PRODUCTION

Includes Ferroalloys, in Net Tons

	Pig Iron 1951	Pig Iron 1952
January	201,131	209,153
February	193,228	198,162
March	220,803	240,755
April	211,112	214,330
May	218,989	237,079
June	213,184	229,266
July	210,263	229,561
August	203,186	221,387
September	212,485	222,686
October	224,511	224,000*
November	223,467	224,000*
December	220,537	224,000*
Total	2,552,696	2,675,379*

	Ferroalloys 1951	Ferroalloys 1952
January	19,062	21,458
February	14,914	22,171
March	19,451	23,097
April	19,552	19,856
May	23,542	21,112
June	19,774	17,591
July	17,608	15,508
August	25,327	16,583
September	22,977	17,672
October	25,777	17,500*
November	22,271	17,500*
December	20,675	17,500*
Total	250,930	227,548*

* Estimated.

Source: Dominion Bureau of Statistics

BLAST FURNACE PRODUCTION

Year	Net Tons Pig Iron	Net Tons Ferro-alloys	Total Pig Iron and Ferro-alloys
1930	836,839	73,049	909,888
1931	470,442	52,375	522,817
1932	161,425	18,100	179,525
1933	254,592	33,737	288,329
1934	455,789	37,055	492,844
1935	678,302	61,182	740,484
1936	759,618	87,679	847,297
1937	1,006,717	91,931	1,098,648
1938	799,710	59,720	849,430
1939	848,418	85,531	931,949
1940	1,309,161	151,661	1,460,822
1941	1,528,054	213,218	1,741,272
1942	1,975,015	213,636	2,188,651
1943	1,758,265	218,687	1,852,628
1944	1,852,628	182,428	4,012,008
1945	1,777,958	186,978	1,964,936
1946	1,403,758	116,995	1,820,753
1947	1,969,847	149,832	2,119,679
1948	2,120,909	250,659	2,371,568
1949	2,154,352	211,603	2,365,955
1950	2,309,732	181,575	2,491,307
1951	2,552,696	250,930	2,803,626
1952*	2,675,379	227,548	2,973,099

* December output estimated.

Source: Dominion Bureau of Statistics

PIG IRON CAPACITY, OUTPUT

Excluding Ferroalloys, Net Tons

	Capacity	Production	Percent of Capacity
1937	1,450,875	1,006,717	69.3
1938	1,450,875	789,710	54.4
1939	1,450,875	848,418	58.3
1940	1,450,875	1,309,161	90.2
1941	1,815,875	1,528,054	84.1
1942	2,123,320	1,975,015	93.0
1943	2,756,160	1,758,265	63.7
1944	2,770,760	1,852,628	66.8
1945	2,770,760	1,777,958	64.1
1946	2,770,760	1,403,758	50.6
1947	2,745,760	1,969,847	71.7
1948	2,745,760	2,120,909	77.2
1949	2,745,760	2,154,352	78.4
1950	2,745,760	2,309,732	84.1
1951	3,025,000	2,552,696	84.3
1952	3,025,000	2,675,379*	88.4

* December output estimated.

Source: Dominion Bureau of Statistics

3 RAW MATERIALS

Pig iron: Composite prices . . . Averages of basic and foundry iron prices in the Valley, Birmingham and Granite City . . .

GRANITE CITY, ILL., PIG IRON

Foundry, Gross Ton, at Furnace

	1937	1938	1939	1940*	1945*	1946
Jan.	$21.00	$24.00	$21.00	$23.00	$24.00	$25.75
Feb.	21.25	24.00	21.00	23.00	24.50	25.75
March	23.60	24.00	21.00	23.00	25.00	26.13
April	24.00	24.00	21.00	23.00	25.00	26.50
May	24.00	24.00	21.00	23.00	25.00	26.50
June	24.00	23.00	21.00	23.00	25.00	26.50
July	24.00	20.00	21.00	23.00	25.00	26.50
August	24.00	20.00	21.00	23.00	25.00	26.50
Sept.	24.00	20.25	22.00	23.00	25.00	26.50
October	24.00	21.00	23.00	23.00	25.30	26.50
Nov.	24.00	21.00	23.00	23.00	25.75	26.50
Dec.	24.00	21.00	23.00	23.50	25.75	29.70
Average	23.49	22.20	21.59	23.04	25.02	27.44

	1947	1948	1949	1950	1951	1952
Jan.	$30.50	$39.25	$48.40	$48.40	$54.40	$54.40
Feb.	30.50	40.00	48.40	48.40	54.40	54.40
March	32.00	40.00	48.40	48.40	54.40	54.40
April	33.50	40.00	48.40	48.40	54.40	54.40
May	33.50	41.43	48.40	48.40	54.40	54.40
June	33.50	45.75	48.40	48.40	54.40	54.40
July	34.80	45.75	48.40	48.40	54.40	54.90
August	36.63	47.34	48.40	48.40	54.40	56.90
Sept.	37.00	48.40	48.40	48.40	54.40	56.90
October	37.00	48.40	48.40	51'40	54.40	56.90
Nov.	37.00	48.40	48.40	51.40	54.40	56.90
Dec.	37.00	48.40	48.40	53.65	54.40	56.90
Average	34.39	44.42	48.40	49.34	54.40	55.48

† Prior to September 1933, St. Louis prices are given.
* Price unchanged at $24.00 from 1941 through 1944.

BIRMINGHAM PIG IRON PRICES

Foundry Grade, Per Gross Ton

	1937	1938	1939*	1941**	1945**	1946
Jan.	$17.38	$20.38	$17.38	$19.38	$20.38	$22.13
Feb.	17.68	20.38	17.38	19.38	20.86	22.13
March	19.93	20.38	17.38	19.89	21.38	22.51
April	20.38	20.38	17.38	20.38	21.38	22.88
May	20.38	20.38	17.38	20.38	21.38	22.88
June	20.38	19.58	17.38	20.38	21.38	24.88
July	20.38	18.38	17.38	20.38	21.38	24.88
August	20.38	18.38	17.38	20.38	21.38	24.88
Sept.	20.38	16.63	18.38	20.38	21.38	24.88
October	20.38	17.38	19.38	20.38	21.68	24.88
Nov.	20.38	17.38	19.38	20.38	22.13	24.88
Dec.	20.38	17.38	19.38	20.38	22.13	26.88
Average	19.87	18.58	17.96	20.17	21.40	24.06

	1947	1948	1949	1950	1951	1952
Jan.	$22.13	$37.38	$43.38	$39.38	$48.88	$48.88
Feb.	26.88	37.38	43.38	42.38	48.88	48.88
March	29.13	37.38	43.38	42.38	48.88	48.88
April	29.88	37.38	43.38	42.38	48.88	48.88
May	29.88	38.38	39.71	42.38	48.88	48.88
June	29.88	39.38	39.38	42.38	48.88	48.88
July	31.28	31.04	39.38	42.38	48.88	49.38
August	34.13	43.38	39.38	42.38	48.88	51.38
Sept.	34.88	43.38	39.38	42.67	48.88	51.38
October	34.88	43.38	39.38	45.88	48.88	51.38
Nov.	34.88	43.38	39.38	45.88	48.88	51.38
Dec.	34.60	43.38	39.38	48.88	48.88	51.38
Average	31.43	40.43	40.74	43.53	48.88	49.96

† Subject to 38c a ton deduction for 0.70 phosphorus and over.
* Price unchanged at $19.38 through 1940.
** Price unchanged at $20.38 from 1942 through 1944.

FOUNDRY PIG IRON PRICES

Mahoning, Shenango Valley, Per Gross Ton

	1936	1937	1938	1939	1940*	1945*
Jan.	$19.50	$21.00	$24.00	$21.00	$23.00	$24.00
Feb.	19.50	21.25	24.00	21.00	23.00	24.50
March	19.50	23.60	24.00	21.00	23.00	25.00
April	19.50	24.00	24.00	21.00	23.00	25.00
May	19.50	24.00	24.00	21.00	23.00	25.00
June	19.50	24.00	23.20	21.00	23.00	25.00
July	19.50	24.00	20.00	21.00	23.00	25.00
August	19.50	24.00	20.00	21.00	23.00	25.00
Sept.	19.50	24.00	20.25	22.00	23.00	25.00
Oct.	19.50	24.00	21.00	23.00	23.00	25.30
Nov.	19.75	24.00	21.00	23.00	23.00	25.75
Dec.	20.25	24.00	21.00	23.00	23.40	25.75
Average	19.60	23.49	22.20	21.59	23.03	25.02

	1946	1947	1948**	1950	1951	1952
Jan.	$25.75	$30.50	$39.37	$46.50	$52.50	$52.50
Feb.	25.75	30.50	39.50	46.50	52.50	52.50
March	26.13	33.50	39.50	46.50	52.50	52.50
April	26.50	33.50	39.50	46.50	52.50	52.50
May	26.50	33.50	39.50	46.50	52.50	52.50
June	28.50	33.50	39.50	46.50	52.50	52.50
July	28.50	34.70	42.50	46.50	52.50	53.00
August	28.50	36.50	43.50	46.50	52.50	55.00
Sept.	28.50	36.50	43.50	47.50	52.50	55.00
October	28.50	36.50	46.12	49.50	52.50	55.00
Nov.	28.50	36.50	46.50	49.50	52.50	55.00
Dec.	30.10	36.70	46.50	52.12	52.50	55.00
Average	27.64	34.36	42.12	47.55	52.50	53.75

* Price unchanged at $24.00 from 1941 through 1944.
** Price unchanged at $46.50 through 1949.

COMPOSITE PIG IRON PRICE

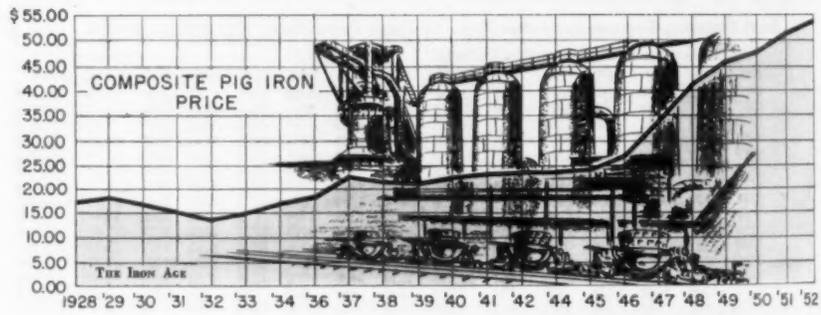
Average of THE IRON AGE quotations on basic pig iron at Valley furnaces and foundry iron at Chicago, Birmingham, Buffalo, Valley and Philadelphia, in gross tons.

	1931	1932	1933	1934	1936	1937
Jan.	$15.90	$14.68	$13.56	$16.90	$18.84	$20.25
Feb.	15.80	14.51	13.56	16.90	18.84	20.50
March	15.71	14.45	13.56	16.90	18.84	22.85
April	15.79	14.35	13.76	17.07	18.84	23.25
May	15.76	14.12	14.48	17.90	18.84	23.25
June	15.62	14.01	15.01	17.90	18.84	23.25
July	15.56	13.76	15.50	17.90	18.84	23.25
August	15.51	13.69	16.09	17.90	18.73	23.25
Sept.	15.44	13.64	16.71	17.90	18.73	23.25
October	15.21	13.63	16.61	17.90	18.73	23.25
Nov.	14.97	13.59	16.61	17.90	18.98	23.25
Dec.	14.86	13.56	16.90	17.90	19.73	23.25
Average	15.51	14.00	15.20	17.58	18.90	22.74

	1938	1939	1940	1941*	1945*	1946
Jan.	$23.25	$20.61	$22.61	$23.45	$23.61	$25.37
Feb.	23.25	20.61	22.61	23.45	24.11	25.37
March	23.25	20.61	22.61	23.53	24.61	25.75
April	23.25	20.61	22.61	23.61	24.61	26.12
May	23.25	20.61	22.61	23.61	24.61	26.45
June	22.98	20.61	22.61	23.61	24.61	28.13
July	19.61	20.61	22.61	23.61	24.61	28.13
August	19.61	20.61	22.61	23.61	24.61	28.13
Sept.	19.82	21.61	22.61	23.61	24.61	28.13
October	20.57	22.61	22.61	23.61	24.91	28.13
Nov.	20.61	22.61	22.61	23.61	25.37	28.13
Dec.	20.61	22.61	22.95	23.61	25.37	29.64
Average	21.67	21.19	22.64	23.58	24.81	27.29

	1947	1948	1949	1950	1951	1952
Jan.	$30.14	$39.83	$46.79	$45.98	$52.69	$52.72
Feb.	30.15	40.27	46.74	46.38	52.69	52.72
March	32.92	40.32	46.74	46.38	52.69	52.72
April	33.15	40.11	46.64	46.38	52.69	52.72
May	33.15	40.33	45.97	46.38	52.69	52.77
June	33.15	40.51	45.91	46.38	52.69	52.77
July	34.52	42.25	45.91	46.38	52.69	53.27
August	36.84	44.34	45.91	46.56	52.69	55.26
Sept.	36.95	44.96	45.90	47.16	52.69	55.26
October	36.95	46.63	45.88	49.29	52.72	55.26
Nov.	37.04	48.84	45.88	49.69	52.72	55.26
Dec.	37.24	46.91	45.88	52.50	52.72	55.26
Average	34.35	42.94	46.18	47.85	52.70	53.83

* Price unchanged at $23.61 from 1942 through 1944.



A special feature of this issue is the twenty-fourth revision of The Iron Age "Directory of Tool Steels and Carbides." New in this edition is the classification of many steels by SAE symbols to permit relating of various tool steel brands. This system also permits listing in convenient tabular form the various physical properties, heat treating and forging temperatures of the various steels.

As usual, the directory also includes six charts of comparable tool steel brands, showing both the SAE and the ASM classifications where they are applicable.

BASIC PIG IRON, VALLEY

Mahoning, Shenango Valley, Gross Ton

	1936	1937	1938	1939	1940*	1945*
Jan.	$19.00	$20.50	$23.50	$20.50	$22.50	$23.50
Feb.	19.00	20.75	23.50	20.50	22.50	24.00
March	19.00	23.10	23.50	20.50	22.50	24.50
April	19.00	23.50	23.50	20.50	22.50	24.50
May	19.00	23.50	23.50	20.50	22.50	24.50
June	19.00	23.50	22.70	20.50	22.50	24.50
July	19.00	23.50	19.50	20.50	22.50	24.50
August	19.00	23.50	19.50	20.50	22.50	24.50
Sept.	19.00	23.50	19.75	21.50	22.50	24.50
October	19.00	23.50	20.50	22.50	22.50	24.80
Nov.	19.25	23.50	20.50	22.50	22.50	25.25
Dec.	20.00	23.50	20.50	22.50	22.90	25.25
Average	19.10	22.99	21.70	21.06	22.53	24.52

	1946	1947	1948**	1950	1951	1952
Jan.	$25.25	$30.00	$38.87	$46.00	$52.00	$52.00
Feb.	25.25	30.00	39.00	46.00	52.00	52.00
March	25.63	33.00	39.00	46.00	52.00	52.00
April	26.00	33.00	39.00	46.00	52.00	52.00
May	26.00	33.00	39.00	46.00	52.00	52.00
June	28.00	33.00	39.00	46.00	52.00	52.00
July	28.00	34.20	42.00	46.00	52.00	52.50
August	28.00	36.00	43.00	46.00	52.00	54.50
Sept.	28.00	36.00	43.00	46.75	52.00	54.50
October	28.00	36.00	45.62	49.00	52.00	54.50
Nov.	28.00	36.00	46.00	49.00	52.00	54.50
Dec.	29.60	36.20	46.00	51.62	52.00	54.50
Average	27.14	34.78	41.62	47.03	52.00	53.08

* Price unchanged at $23.50 from 1941 through 1944.
** Price unchanged at 46.00 through 1949.

Foundry and malleable pig iron prices . . . Prices, average analyses and grades of Lake Superior iron ores . . .

RAW MA[illegible] 3

CHICAGO FOUNDRY PIG IRON

Per Gross Ton, at Furnace

	1936	1937	1938	1940*	1945*	1946
Jan.	$19.50	$21.00	$24.00	$23.00	$24.00	$25.75
Feb.	19.50	21.25	24.00	23.00	24.50	25.75
Mar.	19.50	23.60	24.00	23.00	25.00	26.13
Apr.	19.50	24.00	24.00	23.00	25.00	26.50
May	19.50	24.00	24.00	23.00	25.00	26.50
June	19.50	24.00	23.20	23.00	25.00	28.50
July	19.50	24.00	20.00	23.00	25.00	28.50
Aug.	19.50	24.00	20.00	23.00	25.00	28.50
Sept.	19.50	24.00	20.25	23.00	25.00	28.50
Oct.	19.50	24.00	21.00	23.00	25.30	28.50
Nov.	19.75	24.00	21.00	23.00	25.75	28.50
Dec.	20.50	24.00	21.00	23.40	25.75	30.10
Average	19.60	23.49	22.20	23.03	25.02	27.64

	1947	1948	1949	1950	1951	1952
Jan.	$30.50	$38.75	$46.50	$46.50	$52.50	$52.50
Feb.	30.50	39.00	46.50	46.50	52.50	52.50
Mar.	33.00	39.00	46.50	46.50	52.50	52.50
Apr.	33.00	39.00	46.50	46.50	52.50	52.50
May	33.00	39.00	46.50	46.50	52.50	52.50
June	33.00	39.00	46.50	46.50	52.50	52.50
July	34.20	42.00	46.50	46.50	52.50	53.00
Aug.	36.00	43.00	46.50	46.50	52.50	55.00
Sept.	36.00	43.00	46.50	47.50	52.50	55.00
Oct.	36.00	46.50	46.50	49.50	52.50	55.00
Nov.	36.00	46.50	46.50	49.50	52.50	55.00
Dec.	36.40	46.50	46.50	52.50	52.50	55.00
Average	34.80	41.77	46.50	47.58	52.50	53.75

* Price unchanged at $24.00 from 1941 through 1944.

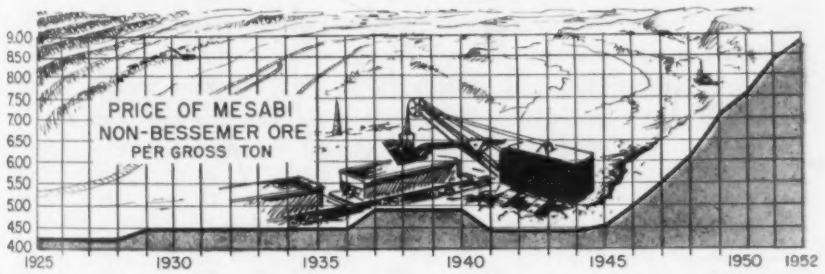
BUFFALO FOUNDRY PIG IRON

Per Gross Ton, at Furnace

	1937	1938	1939	1940*	1945*	1946
Jan.	$21.00	$24.00	$21.00	$23.00	$24.00	$25.75
Feb.	21.25	24.00	21.00	23.00	24.50	25.75
Mar.	23.60	24.00	21.00	23.00	25.00	26.13
Apr.	24.00	24.00	21.00	23.00	25.00	26.50
May	24.00	24.00	21.00	23.00	25.00	26.50
June	24.00	23.20	21.00	23.00	25.00	28.50
July	24.00	20.00	21.00	23.00	25.00	28.50
Aug.	24.00	20.00	21.00	23.00	25.00	28.50
Sept.	24.00	20.13	22.00	23.00	25.00	28.50
Oct.	24.00	20.88	23.00	23.00	25.30	28.50
Nov.	24.00	21.00	23.00	23.00	25.75	28.50
Dec.	24.00	21.00	23.00	23.40	25.75	30.10
Average	23.40	22.18	21.59	23.03	25.02	27.64

	1947	1948	1949	1950	1951	1952
Jan.	$30.50	$40.37	$47.28	$46.50	$52.50	$52.50
Feb.	30.50	42.12	47.00	46.50	52.50	52.50
Mar.	32.38	42.45	47.00	46.50	52.50	52.50
Apr.	33.00	41.19	46.75	46.50	52.50	52.50
May	33.00	41.37	46.50	46.50	52.50	52.50
June	33.00	41.44	46.50	46.50	52.50	52.50
July	34.20	42.08	46.50	46.50	52.50	53.00
Aug.	37.37	44.90	46.50	46.50	52.50	55.00
Sept.	37.18	45.87	46.50	47.25	52.50	55.00
Oct.	37.00	47.12	46.50	49.50	52.50	55.00
Nov.	37.75	47.50	46.50	49.50	52.50	55.00
Dec.	38.00	47.50	46.50	52.50	52.50	55.00
Average	34.49	43.65	46.67	47.56	52.50	53.75

* Price unchanged at $24.00 from 1941 through 1944.



LAKE SUPERIOR IRON ORES

Per Gross Ton at Lower Lake Ports

BESSEMER ORES	Guarantee		Price	
	Iron Natural	Phosphorus Dry	Old Range	Mesabi
1915	55.00	0.045	$3.75	$3.45
1916	55.00	0.045	4.45	4.20
1917	55.00	0.045	5.95	5.70
1918 to July 1	55.00	0.045	5.95	5.70
1918-July 1 to Sept. 30	55.00	0.045	6.40	6.15
1918-Oct. 1 on	55.00	0.045	6.65	6.40
1919	55.00	0.045	6.45	6.20
1920	55.00	0.045	7.45	7.20
1921	55.00	0.045	6.45	6.20
1922	55.00	0.045	5.95	5.70
1923	55.00	0.045	6.45	6.20
1924	55.00	0.045	4.65	5.40
1925 through 1928	51.50	0.045	4.55	4.40
1929 through 1936	51.50	0.045	4.80	4.65
1937 to Apr. 15, 1940	51.50	0.045	5.25	5.10
1940-Apr. 16 on	51.50	0.045	4.75	4.80
1941 through 1944	51.50	0.045	4.75	4.80
1945 to June 24, 1946	51.50	0.045	4.95	4.70
1946-June 24 to Dec. 31	51.50	0.045	5.45	5.20
1947 to Apr. 1, 1948	51.50	0.045	5.95	5.70
1948-Apr. 1 on	51.50	0.045	6.60	6.35
1949	51.50	0.045	7.60	7.35
1950 Feb. 1 to Dec. 1	51.50	0.045	8.10	7.85
1950 Dec. 1 on	51.50	0.045	8.70	8.45
1951	51.50	0.045	8.70	8.45
1952 to July 25	51.50	0.045	8.70	8.45
1952-July 26 on	51.50	0.045	9.45	9.20

NON-BESSEMER ORES	Guarantee	Price		
	Iron Natura	Old Range	Mesabi	High Phosphorus
1915	51.50	$3.00	$2.80	....
1916	51.50	3.70	3.55	....
1917	51.50	5.20	5.05	....
1918 to July 1	51.50	5.20	5.05	....
1918-July 1 to Sept. 30	51.50	5.65	5.50	....
1918-Oct. 1 on	51.50	5.90	5.75	....
1919	51.50	5.70	5.55	$5.35
1920	51.50	6.70	6.55	6.35
1921	51.50	5.70	5.55	5.35
1922	51.50	5.20	5.05	4.85
1923	51.50	5.70	5.55	5.35
1924	51.50	4.90	4.75	4.55
1925 through 1928	51.50	4.40	4.25	4.15
1929 through 1936	51.50	4.65	4.50	4.40
1937 to Apr. 15, 1940	51.50	5.10	4.95	4.85
1940-Apr. 16 on	51.50	4.60	4.45	4.35
1941 through 1944	51.50	4.60	4.45	4.35
1945 to June 24, 1946	51.50	4.80	4.55	4.55
1946-June 24 to Dec. 31	51.50	5.30	5.05	5.05
1947 to Apr. 1, 1948	51.50	5.80	5.55	5.55
1948-Apr. 1 on	51.50	6.45	6.20	6.20
1949	51.50	7.45	7.20	7.20
1950 Feb. 1 to Dec. 1	51.50	7.95	7.70	7.70
1950 Dec. 1 on	51.50	8.55	8.30	8.30
1951	51.50	8.55	8.30	8.30
1952 to July 25	51.50	8.55	8.30	8.30
1952-July 26 on	51.50	9.30	9.05	9.05

MALLEABLE PIG IRON PRICES

Per Gross Ton, Mahoning, Shenango Valley

	1936	1937	1938	1939	1940*	1945*
Jan.	$19.50	$21.00	$24.00	$21.00	$23.00	$24.00
Feb.	19.50	21.25	24.00	21.00	23.00	24.50
Mar.	19.50	23.60	24.00	21.00	23.00	25.00
Apr.	19.50	24.00	24.00	21.00	23.00	25.00
May	19.50	24.00	24.00	21.00	23.00	25.00
June	19.50	24.00	23.00	21.00	23.00	25.00
July	19.50	24.00	20.00	21.00	23.00	25.00
Aug.	19.50	24.00	20.00	21.00	23.00	25.00
Sept.	19.50	24.00	20.25	22.00	23.00	25.00
Oct.	19.50	24.00	21.00	23.00	23.00	25.30
Nov.	19.75	24.00	21.00	23.00	23.00	25.75
Dec.	20.50	24.00	21.00	23.00	23.50	25.75
Average	19.60	23.49	22.20	21.59	23.04	25.02

	1946	1947	1948**	1950	1951	1952
Jan.	$25.75	$30.50	$39.50	$46.50	$52.50	$52.50
Feb.	25.75	30.50	39.50	46.50	52.50	52.50
Mar.	26.13	33.50	39.50	46.50	52.50	52.50
Apr.	26.50	33.50	39.50	46.50	52.50	52.50
May	26.50	33.50	39.50	46.50	52.50	52.50
June	28.50	33.50	39.50	46.50	52.50	52.50
July	28.50	34.70	42.50	46.50	52.50	53.00
Aug.	28.50	36.50	43.50	46.50	52.50	55.00
Sept.	28.50	36.50	43.50	47.50	52.50	55.00
Oct.	28.50	36.50	46.12	49.50	52.50	55.00
Nov.	28.50	36.50	48.50	49.50	52.50	55.00
Dec.	30.10	36.70	46.50	52.50	52.50	55.00
Average	27.48	34.36	42.13	47.58	52.50	53.75

* Price unchanged at $24.00 from 1941 through 1944
** Price unchanged at $46.50 through 1949.

LAKE SUPERIOR IRON ORES

Avge. Analyses, Combined Ranges, Grades

Year	Analyses, Pct				
	Iron, Natural	Phos.	Silica	Mang.	Moisture
1951	50.25	0.090	9.87	0.77	11.22
1950	50.38	0.092	9.85	0.77	11.11
1949	50.39	0.096	9.72	0.78	11.12
1948	50.49	0.093	9.30	0.76	11.35
1947	50.91	0.093	9.09	0.75	11.28
1946	51.32	0.087	8.83	0.74	11.22
1945	51.69	0.089	8.52	0.72	10.96
1944	51.72	0.088	8.42	0.74	11.02
1943	51.58	0.091	8.32	0.82	11.06
1942	51.65	0.089	8.21	0.79	10.98
1941	51.83	0.085	8.18	0.78	11.01
1940	52.09	0.085	8.00	0.77	10.93
1939	51.75	0.085	8.27	0.76	10.73
1938	51.90	0.089	8.25	0.81	10.13
1937	51.53	0.091	8.27	0.82	11.31

Source: Lake Superior Iron Ore Assn.

SHIPMENTS OF IRON ORE

Lake Superior Shipments, Gross Tons

1952	74,910,798
1951	89,092,012
1950	78,205,592
1949	69,556,268
1948	82,655,757
1947	77,210,278
1946	58,975,000
1945	75,207,000
1944	81,039,000
1943	65,116,000
1942	92,070,000
1941	79,941,000
1940	63,308,000
1939	44,984,000
1938	19,353,000
1937	61,973,000

Source: Lake Superior Iron Ore Assn.

U. S. IRON ORE CONSUMPTION

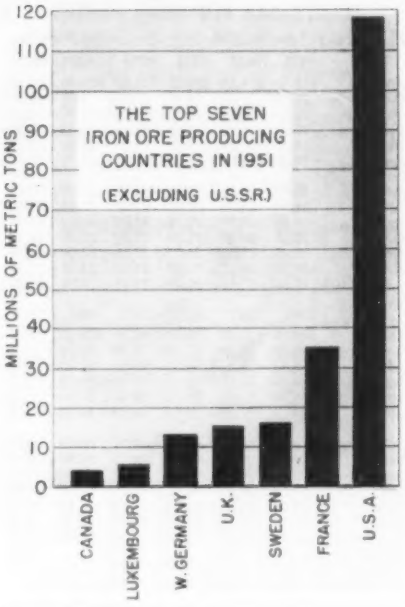
In Long Tons

1944	99,942,454
1945	85,158,495
1946	72,174,844
1947	96,115,549
1948	100,498,557
1949	91,123,220
1950	108,610,273
1951*	118,400,000
1952**	97,000,000

* Subject to revision.
** Estimate by The Iron Age.

3 MATERIALS

Iron Ore: World iron ore production by countries . . . U. S. production of iron ore . . . Iron mining employment and wages.



WORLD PRODUCTION OF IRON ORE

In Thousands of Metric Tons[1]

Country[1]	1946	1947	1948	1949	1950	1951
North America:						
Canada	1,406	1,741	1,213	3,334	[2] 3,271	4,297
Newfoundland	1,264	1,467	1,492			
Cuba		63	37	12	12	17
Mexico	275	332	333	363	420	460
United States	71,960	94,586	102,625	86,301	99,619	*118,298
South America:						
Argentina	55	61	[3]	[3]	[3]	[3]
Brazil	518	927	[2] 1,572	[2] 1,888	[2] 2,057	2,555
Chile[4]	1,353	1,606	2,545	2,597	2,976	3,252
Venezuela					190	1,270
Europe:						
Austria	462	885	1,269	1,488	1,859	2,370
Belgium	40	56	[2] 89	42	46	79
Czechoslovakia	1,116	1,363	1,428	[5] 1,400	[5] 1,600	[3]
France[6]	16,232	18,719	23,061	31,424	[2] 29,983	35,264
Germany: East Germany[7]	236	283	[5] 250	[5] 250	[5] 328	[3]
West Germany[7]	3,904	4,483	7,276	9,112	10,882	12,923
Greece (exports)	13	41	47	22	41	56
Hungary	133	244	318	339	368	[3]
Italy	132	[2] 227	[2] 549	521	442	515
Luxembourg	2,247	1,992	3,399	4,137	3,845	5,625
Norway	60	128	199	[2] 275	[2] 304	353
Poland	395	504	659	699	790	[5] 850
Rumania	112	121	[5] 209	[5] 324	[5] 395	[5] 510
Spain	1,596	1,514	1,631	1,876	[2] 2,088	2,316
Sweden	6,867	[2] 8,894	[2] 13,286	[2] 13,729	13,927	16,111
Switzerland	18	45	75	70	55	86
U.S.S.R.[8]	[5] 21,000	[5] 24,000	[3]	[3]	[3]	[3]
United Kingdom: Great Britain[9]	12,368	11,269	13,299	13,612	[2] 13,143	14,882
Yugoslavia	399	739	879	835	[2] 826	561
Asia:						
China	[10] 15	[10] 19	[5] [10] 247	[5] 500	[5] 2,000	[5] 3,000
Hong Kong			1	59	169	161
India	2,446	2,539	2,321	2,854	[2] 3,005	3,714
Japan	566	500	561	[2] 794	[2] 927	1,099
Korea, north	[5] 75	[5] 93	[5] 200	[3]	[3]	[3]
Malaya	[12]	1	1	9	507	851
Philippines			18	370	599	903
Portuguese India			8	151	131	436
Thailand					3	7
Turkey	112	149	192	211	234	226
U.S.S.R.	[8]	[8]	[3]	[3]	[3]	[3]
Africa:						
Algeria	1,671	1,558	1,872	2,538	2,573	2,815
French Morocco	125	[2] 154	[2] 301	357	319	333
Liberia						171
Northern Rhodesia	[12]	2	[12]	2		
Sierra Leone	741	854	968	[13] 1,001	1,185	[3]
Southern Rhodesia		[12]	30	51	57	80
Spanish Morocco	787	869	[2] 885	[2] 893	[2] 951	948
Tunisia	184	404	[2] 696	712	758	923
Union of South Africa	947	1,162	1,164	1,242	1,189	1,421
Oceania:						
Australia	1,849	2,181	2,077	1,484	2,403	2,458
New kaledonia					15	
New Zealand	8	6	5	4	4	3
Total (estimate)	154,000	187,000	217,000	220,000	[2] 247,000	293,000

Source: Foreign Minerals Statistics Unit, Region IX, Bureau of Mines

NOTES TO IRON ORE TABLE

[1] In addition to countries listed, Bulgaria, Egypt, Madagascar, Portugal, and South-West Africa report production of iron ore in past years, but quantity produced is believed insufficient to affect estimate of world total.

[2] Revised figure.

[3] Data not available; included in total.

[4] Production of Tofo mines.

[5] Estimate.

[6] Including Moselle (Lorraine).

[7] Exclusive of manganiferrous iron ore carrying 12 to 30 percent manganese.

[8] U.S.S.R. in Asia included with U.S.S.R. in Europe.

[9] Exclusive of bog ore, which is used mainly for purification of gas.

[10] Production of National Resources Commission only.

[11] Includes iron sand production as follows: 1946, 10,472 tons; 1947, 3,772 tons; 1948, 2,588 tons; 1949, 33,120 tons; 1950, 101,544 tons; 1951, 213,924 tons.

[12] Less than 500 tons.

[13] Marketable ore only; washed fines are excluded.

* Preliminary.

IRON MINING WAGES, EMPLOYMENT

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1947	$52.34	40.2	$1.302	31.6	34.3
1948	58.32	41.3	1.412	33.6	36.6
1949	59.06	39.8	1.484	30.4	33.7
1950	61.96	40.9	1.515	31.9	35.5
1951	72.63	42.5	1.709	33.8	37.6
1952:					
Jan.	74.57	44.1	1.691	33.1	37.1
Feb.	76.32	44.4	1.719	32.8	36.8
Mar.	78.42	45.2	1.735	32.9	36.9
Apr.	72.33	42.3	1.710	33.7	37.9
May	77.80	45.1	1.725	34.5	38.6
June	49.39	29.0	1.703	7.0	11.2
July	70.58	41.2	1.713	6.9	2.8
Aug.	84.46	47.0	1.797	26.3	22.1

Source: Bureau of Labor Statistics

U. S. PRODUCTION OF IRON ORE

In Gross Tons, Includes Lake Superior, Northeastern, Southeastern, Western

Year	Lake Superior	Northeastern	Southeastern	Western	Total
1931	25,877,418	938,960	3,644,606	672,520	31,131,502
1932	8,139,427	165,009	1,375,459	167,021	9,846,916
1933	14,611,032	396,228	2,159,958	385,970	17,553,188
1934	21,031,019	908,944	2,347,625	300,028	24,587,616
1935	25,368,637	1,349,247	3,295,884	526,684	30,540,282
1936	41,781,215	2,069,764	4,214,587	723,179	48,788,745
1937	61,657,635	3,145,177	6,351,053	939,683	72,093,548
1938	21,308,410	2,306,910	4,325,729	506,233	28,447,282
1939	41,679,808	3,112,893	[18]6,021,781	917,448	51,731,730
1940	61,471,323	3,559,924	[17]7,446,103	1,218,549	73,695,899
1941	78,858,332	3,962,072	8,145,900	1,443,275	92,409,679
1942	91,005,021	3,119,508	9,159,228	1,599,429	[2]105,526,186
1943	85,789,017	3,467,575	8,478,738	2,859,994	[2]101,247,838
1944	79,111,320	3,849,398	7,121,676	3,442,405	[2]94,117,708
1945	74,821,045	3,820,147	6,329,987	3,087,774	[2]88,376,393
1946	59,042,154	2,596,349	6,247,096	2,450,611	[2]70,843,113
1947	76,531,769	3,987,195	7,527,321	4,502,512	[2]93,091,629
1948	82,630,430	4,422,971	8,365,390	5,104,703	[2]101,003,492
1949	68,494,123	3,863,833	7,601,822	4,441,671	[2]84,937,447
1950	79,627,294	4,474,834	7,507,508	5,860,755	[2]98,045,360
1951	[3]93,950,000	[3]5,070,000	[3]8,420,000	[3]8,350,000	[2]116,430,000

[1] Includes Texas. [2] Includes by-product ore not assigned to districts.
[3] Estimate by Bureau of Mines.

Source: U. S. Bureau of Mines

Scrap prices: No. 1 heavy melting and cast prices in major steelmaking areas.

RAW MAT[illegible] 3

PHILADELPHIA HEAVY MELTING

Prices of No. 1 Scrap, Per Gross Ton

	1939	1940	1941*	1944*	1945	1946
Jan.	$15.25	$18.00	$20.50	$18.75	$18.75	$18.75
Feb.	15.25	17.38	20.00	18.75	18.75	18.75
Mar.	15.38	17.12	20.00	18.75	18.75	18.75
Apr.	15.62	16.75	19.00	18.75	18.75	18.75
May	15.25	17.56	18.75	18.75	18.40	18.75
June	15.41	19.69	18.75	18.75	18.25	18.75
July	15.62	18.95	18.75	18.75	18.75	18.75
Aug.	18.25	19.56	18.75	18.60	18.75	18.75
Sept	18.87	20.50	18.75	16.66	18.75	18.75
Oct.	22.35	20.70	18.75	14.60	18.75	18.75
Nov.	20.75	20.75	18.75	15.50	18.75	22.94
Dec.	18.92	20.85	18.75	18.50	18.75	28.00
Average	17.08	18.98	19.13	17.01	18.68	19.87

	1947	1948	1949	1950	1951	1952
Jan.	$31.00	$42.50	$42.75	$23.10	$46.70	$41.50†
Feb.	33.38	41.50	39.75	23.00	43.75	41.50†
Mar.	39.38	40.80	35.10	23.85	42.50†	41.50†
Apr.	33.10	41.50	23.00	25.39	42.50†	41.50†
May	29.69	42.31	22.00	28.70	42.50†	41.50†
June	33.83	42.50	19.50	34.63	42.50†	40.50
July	38.45	43.12	17.50	32.81	42.50†	40.65
Aug.	38.50	45.00	18.31	36.50	42.50†	41.50†
Sept.	36.80	45.00	23.35	38.50	42.50†	41.50†
Oct.	40.25	45.00	24.25	38.50	42.10†	41.50†
Nov.	42.63	44.75	24.50	39.44	41.50†	41.50†
Dec.	41.10	44.50	24.25	42.81	41.50†	41.50†
Average	36.50	43.20	28.19	32.27	42.75	41.35

* Price unchanged at $18.75 throughout 1942 and 1943.
† OPS basing point price ceiling.

PITTSBURGH HEAVY MELTING

Prices of No. 1 Scrap, Per Gross Ton

	1939	1940	1941*	1944*	1945	1946
Jan.	$15.72	$18.25	$22.13	$20.00	$20.00	$20.00
Feb.	15.72	17.50	21.00	20.00	20.00	20.00
March	15.97	16.88	21.00	20.00	20.00	20.00
April	15.61	16.55	20.20	20.00	20.00	20.00
May	14.48	18.37	20.00	20.00	20.00	20.00
June	15.12	20.06	20.00	20.00	20.00	20.00
July	15.56	19.10	20.00	20.00	20.00	20.00
August	16.15	18.56	20.00	19.95	20.00	20.00
Sept.	19.88	20.00	20.00	18.25	20.00	20.00
October	23.05	21.45	20.00	16.10	20.00	20.00
Nov.	20.58	21.69	20.00	17.13	20.00	23.94
Dec.	18.58	22.28	20.00	19.94	20.00	29.00
Average	17.17	19.23	20.36	19.28	20.00	21.08

	1947	1948	1949	1950	1951	1952
Jan.	$32.25	$40.37	$41.25	$29.95	$47.13	$43.00†
Feb.	34.94	40.43	39.25	31.25	45.78	43.00†
March	39.85	40.25	36.30	32.13	44.00†	43.00†
April	35.40	40.25	24.94	33.00	44.00†	43.00†
May	30.38	40.25	23.00	37.75	44.00†	43.00†
June	33.88	40.25	22.00	44.50	44.00†	42.90
July	38.45	40.87	20.75	41.50	44.00†	40.45
August	40.00	42.75	21.94	43.90	44.00†	43.00†
Sept.	37.75	42.75	27.35	43.75	44.00†	43.00†
October	40.75	42.75	29.44	43.75	43.80†	43.00†
Nov.	41.88	42.75	31.95	43.75	43.00†	43.00†
Dec.	40.00	42.75	30.75	45.57	43.00†	43.00†
Average	37.13	41.36	29.08	39.16	44.21	42.78

* Price unchanged at $20.00 throughout 1942 and 1943.
† OPS basing point price ceiling.

CONSUMERS' SCRAP INVENTORIES

In Gross Tons, Purchased and Home

	Purchased	Home
1951:		
January	3,683,349	1,193,547
February	3,257,736	1,162,404
March	2,866,811	1,089,426
April	2,788,029	985,675
May	2,705,975	1,002,910
June	2,626,308	1,044,915
July	2,703,282	1,045,682
August	2,870,576	1,081,783
September	2,877,083	1,084,735
October	2,890,168	1,120,139
November	2,841,628	1,107,005
December	2,828,126	1,070,139
1952:		
January	2,848,194	1,041,230
February	3,164,410	1,029,178
March	3,476,993	1,051,642
April	3,783,532	1,103,345
May	4,105,777	1,127,378
June	4,440,057	1,135,798
July	4,724,411	1,159,623
August	5,043,204	1,230,859

Source: U. S. Bureau of Mines

Careful, conscientious coverage of the iron and steel scrap markets is a regular assignment for a large staff of correspondents and full time Iron Age editors. This week's report appears on pages 500 and 502. A review of the 1952 scrap market is on p. 280.

CHICAGO HEAVY MELTING SCRAP

Prices of No. 1 Scrap, Per Gross Ton‡

	1939	1940	1941*	1944*	1945	1946
Jan.	$13.87	$16.38	$20.00	$18.75	$18.75	$18.75
Feb.	13.94	15.75	19.25	18.75	18.75	18.75
March	14.25	15.69	19.88	18.75	18.75	18.75
April	13.37	15.33	18.95	18.75	18.75	18.75
May	12.75	17.00	18.75	18.75	18.75	18.75
June	13.45	18.19	18.75	18.75	18.75	18.75
July	13.50	17.38	18.75	18.75	18.75	18.75
August	13.87	18.03	18.75	18.75	18.75	18.75
Sept.	16.22	19.22	18.75	18.69	18.75	18.75
October	19.16	19.75	18.75	16.90	18.75	18.75
Nov.	17.85	20.06	18.75	17.00	18.75	23.13
Dec.	16.67	20.60	18.75	18.69	18.75	27.25
Average	14.91	17.73	19.01	18.27	18.75	19.87

	1947	1948	1949	1950	1951	1952
Jan.	$29.75	$39.56	$40.06	$26.70	$44.63	$41.50†
Feb.	31.63	39.12	35.63	27.50	43.02	41.50†
March	36.69	38.95	33.70	28.25	42.50†	41.50†
April	33.05	39.18	23.63	28.75	42.50†	41.50†
May	29.38	39.25	23.00	33.75	42.50†	41.50†
June	30.88	39.25	20.85	38.75	42.50†	40.75
July	36.97	40.81	19.75	37.25	42.50†	39.30
August	39.88	41.75	22.00	39.15	42.50†	41.50†
Sept.	38.75	41.75	26.30	39.81	42.50†	41.50†
October	40.50	41.75	25.50	39.75	42.50†	41.50†
Nov.	39.13	41.75	30.30	39.75	41.50†	41.50†
Dec.	38.90	41.75	26.75	43.44	41.50†	41.50†
Average	35.45	40.40	27.29	35.32	42.75	41.25

* Price unchanged at $18.75 throughout 1942 and 1943.
‡ Changed from net ton basis April 30, 1941.
† OPS basing point price ceiling.

CUPOLA CAST AT CINCINNATI

Prices of No. 1 Scrap, Per Gross Ton

	1936	1937	1939	1940	1941*	1946*
Jan.	$11.37	$15.75	$13.75	$17.65	$22.75	$20.00
Feb.	11.75	16.12	13.75	16.69	22.50	20.00
March	12.40	17.30	14.38	16.25	22.50‡	20.00
April	12.19	17.37	13.56	16.05	.....	20.00
May	11.50	14.44	12.00	16.88	.....	20.00
June	11.20	14.00	12.13	19.38	.....	20.00
July	11.19	14.87	12.25	18.65	.....	20.00
August	12.43	16.25	11.80	18.75	.....	20.00
Sept.	13.60	14.25	15.38	20.12	22.50‡	22.50
October	14.00	13.38	19.55	20.55	22.50	25.00
Nov.	14.00	11.85	18.88	21.00	22.50	26.25
Dec.	15.12	10.75	17.75	22.50	22.50	30.80
Average	12.56	14.69	14.68	18.71	.....	22.05

	1947	1948†	1949†	1950†	1951†	1952†
Jan.	$34.00	$60.00	$60.00	$36.90	$65.50^	$49.00^
Feb.	35.38	66.75	49.00	35.75	49.00^	49.00^
March	47.00	63.70	42.00	38.50	49.00^	49.00^
April	45.60	63.50	32.00	40.50	49.00^	49.00^
May	43.25	63.50	27.50	44.90	49.00^	49.00^
June	44.88	63.50	26.30	46.75	49.00^	49.00^
July	46.50	64.75	25.50	46.50	49.00^	43.50§
August	45.50	67.00	29.88	49.10	49.00^	45.90§
Sept.	44.50	67.00	36.50	53.50	49.00^	49.00^
October	45.50	65.50	40.50	59.20	49.00^	46.00§
Nov.	50.38	65.50	41.00	63.75	49.00^	46.00§
Dec.	53.60	65.50	40.25	65.25	49.00^	46.00§
Average	44.67	64.68	37.54	48.39	50.38	47.53

† Average of No. 1 cupola cast prices.
‡ OPA did not include this grade until September.
* Price unchanged at $20.00 from 1942 through 1945. Ceiling prices do not include delivery costs.
^ OPS ceiling shipping point prices.
§ Delivered. Nominal $3 a ton deducted for shipping, commissions to put prices on comparable F.o.b. basis under OPS system.

MACHINERY CAST AT CHICAGO

No. 1 Scrap Delivered, Per Gross Ton‡

	1936	1937	1939	1940	1941*	1946*
Jan	$12 00	$15 87	$12 56	$14 00	$18 88	$20 00
Feb	12 75	16 25	12 75	13 75	19 25	20 00
March	13 10	17 40	12 75	13 56	20 75	20 00
April	12 50	17 12	12 12	14 81	‡22 33	20 00
May	12 00	15 25	11 75	16 31	21 40	20.00
June	12.00	15.00	12.15	17.31	20.00	20.00
July	12.12	15.75	12.25	16.75	20.00	20.00
Aug.	13.37	16.55	12.25	16.88	20.00	20.00
Sept.	13.60	14.38	14.50	17.13	20.00	22.50
Oct.	14.00	13.18	16.87	17.75	20.00	25.00
Nov.	14.00	11.65	15.65	18.00	20.00	32.28
Dec.	14.75	12.12	14.50	19.13	20.00	41.05
Average	13.02	15.04	13.34	16.26	20.21	23.40

	1947	1948	1949	1950	1951	1952
Jan.	$43.38	$68.00	$57.25	$38.50	$63.00^	$52.00^
Feb.	44.56	65.25	46.00	39.00	52.00^	52.00^
March	46.00	68.50	41.20	39.75	52.00^	46.63†
April	42.70	73.12	29.63	41.50	52.00^	43.45†
May	38.00	72.50	27.90	45.70	52.00^	43.00†
June	41.81	69.90	28.69	47.25	52.00^	41.23†
July	46.00	71.50	30.75	45.50	52.00^	39.10†
Aug.	49.38	74.30	39.30	49.10	52.00^	44.90†
Sept.	49.50	71.25	42.25	50.25	52.00^	45 50†
Oct	51.00	69.87	41.25	52.80	52.00^	45.90†
Nov.	52.75	72.20	43.88	60.38	52.00^	45.19†
Dec.	60.30	69.50	39.85	64.50	52.00^	43.30†
Average	47.12	70.48	39.00	47.85	52.92	45.16

‡ Changed from net ton basis April 30, 1941.
* Price unchanged at $20.00 from 1942 through 1945. Ceiling prices do not include delivery costs.
† Delivered. Nominal $3 per ton deducted for shipping, commission to put prices on F.o.b. basis for comparison purposes.
^ OPS ceiling shipping point prices.

SOFT COAL EMPLOYMENT

Wages of Related Workers

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	72.12	38.0	1.898	413.1	438.2
1949	63.28	32.6	1.941	373.4	399.0
1950	70.35	35.0	2.010	351.0	375.6
1951	77.86	35.2	2.212	353.7	378.2
1952:					
Jan.	86.39	38.5	2.246	343.9	367.8
Feb.	80.27	35.9	2.236	341.8	366.0
Mar.	79.26	35.4	2.239	338.8	362.8
Apr.	66.68	29.9	2.230	332.7	356.6
May	67.18	30.4	2.210	322.9	348.4
June	61.35	27.1	2.264	281.5	305.3
July	63.45	28.1	2.258	244.2	268.7
Aug.	81.80	36.7	2.229	323.1	348.5

Source: Bureau of Labor Statistics

3 MATERIALS

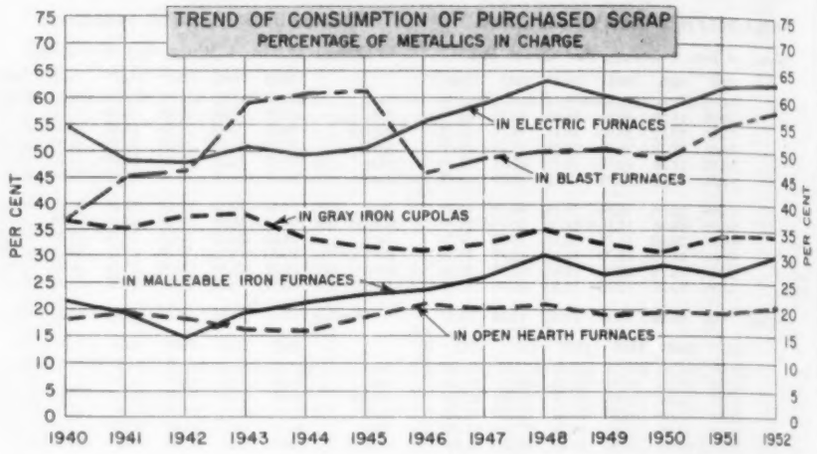
Scrap, coal: Scrap consumption, composite price of No. 1 heavy . . . Ingot rate and scrap price trend . . . Coal consumption.

U. S. CONSUMPTION OF SCRAP

Gross Tons, Domestic, Exports, Imports

	Domestic Consumption (Purchased and Home)	Exports (Purchased)	Imports (Purchased)
1911	12,100,000	77,918	17,272
1912	16,100,000	105,985	23,612
1913	15,300,000	84,429	44,154
1914	12,200,000	33,134	34,839
1915	18,600,000	79,361	79,982
1916	23,400,000	212,788	116,039
1917	26,800,000	145,574	180,034
1918	25,400,000	2,160	63,730
1919	20,700,000	27,275	177,293
1920	26,000,000	219,250	140,645
1921	12,400,000	37,892	41,469
1922	23,700,000	67,784	142,989
1923	27,000,000	65,980	182,068
1924	26,200,000	97,748	86,841
1925	30,700,000	82,573	99,815
1926	32,200,000	104,838	86,725
1927	30,700,000	239,209	80,207
1928	34,000,000	616,148	63,314
1929	37,600,000	557,044	90,479
1930	26,600,000	358,849	27,482
1931	18,300,000	136,125	18,279
1932	10,000,000	227,522	9,775
1933	17,400,000	773,406	56,133
1934	18,800,000	1,835,170	44,421
1935	26,415,330	2,103,959	64,768
1936	38,358,133	1,936,132	142,245
1937	38,006,272	4,092,590	81,640
1938	21,344,934	2,986,591	24,451
1939	32,434,407	3,577,427	29,492
1940	39,758,635	2,820,789	1,927
1941	52,871,657	792,760	64,085
1942	53,806,171	126,473	82,257
1943	55,045,495	48,957	128,018
1944	54,776,072	86,430	97,162
1945	50,170,612	76,318	41,313
1946	44,182,240	121,679	26,984
1947	54,343,000	173,413	32,312
1948	58,285,000	216,093	370,600
1949	48,516,000	263,000	977,154
1950	61,497,000	194,114	652,344
1951	68,518,000	186,405	345,313
1952*	62,900,000	330,000	85,000

* Estimate by Institute of Scrap Iron & Steel.
Source: U. S. Bureau of Mines, and Institute of Scrap Iron and Steel


TREND OF CONSUMPTION OF PURCHASED SCRAP
PERCENTAGE OF METALLICS IN CHARGE
PER CENT
IN ELECTRIC FURNACES
IN BLAST FURNACES
IN GRAY IRON CUPOLAS
IN MALLEABLE IRON FURNACES
IN OPEN HEARTH FURNACES
1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952

Data by Institute of Scrap Iron & Steel, Inc

COMPOSITE PRICE OF NO. 1 HEAVY MELTING SCRAP

Average of Iron Age scrap prices, Pittsburgh, Chicago, Phila., Per Gross Ton

	1939	1940	1941*	1944*	1945	1948		1947	1948	1949	1950	1951	1952
Jan.	$14.94	$17.58	$20.88	$19.17	$19.17	$19.17	Jan.	$31.00	$40.81	$41.36	$26.58	$46.15	$42.00
Feb.	15.01	16.88	20.08	19.17	19.17	19.17	Feb.	33.31	40.35	38.21	27.25	44.19	42.00
Mar.	15.20	16.56	20.29	19.17	19.17	19.17	Mar.	38.65	40.00	35.43	28.05	43.00	42.00
Apr.	14.77	16.14	19.22	19.17	19.17	19.17	Apr.	33.85	40.31	23.86	29.04	43.00	42.00
May	14.17	17.60	19.17	19.17	19.05	19.17	May	29.81	40.60	22.67	33.40	43.00	42.00
June	14.71	19.31	19.17	19.17	19.00	19.17	June	32.79	40.66	20.78	39.29	43.00	41.37
July	14.92	18.47	19.17	19.17	19.17	19.17	July	37.95	41.60	19.33	37.25	43.00	40.10
Aug.	15.43	18.72	19.17	19.10	19.17	19.17	Aug.	39.46	43.16	20.85	39.85	43.00	42.00
Sept.	18.32	19.91	19.17	17.87	19.17	19.17	Sept.	37.77	43.16	25.67	40.69	43.00	42.00
Oct.	21.48	20.63	19.17	15.87	19.17	19.17	Oct.	40.50	43.16	26.40	40.67	42.50	42.00
Nov.	19.66	20.83	19.17	16.54	19.17	23.34	Nov.	41.21	43.04	29.98	40.98	42.00	42.00
Dec.	18.05	21.42	19.17	19.04	19.17	28.23	Dec.	40.00	43.00	27.18	44.02	42.00	42.00
Average	16.39	18.67	19.49	18.55	19.15	20.27	Average	36.36	41.65	27.56	34.75	43.15	41.79

* Price unchanged at $19.17 throughout 1942 and 1943.

U. S. COAL PRODUCTION

In Short Tons, Bituminous, Anthracite

	Bituminous	Anthracite
1931	382,089 396	59 645,652
1932	309,709,872	49,855,221
1933	333,630,533	49,541,344
1934	359,368,022	57,168,291
1935	372,373,122	52,158,783
1936	439,087,903	54,579,535
1937	445,531,449	51,586,433
1938	348,544,764	46,099,027
1939	394,855,325	51,487,377
1940	460,771,500	51,484,640
1941	514,149,245	56,368,267
1942	582,692,937	60,327,729
1943	590,177,069	60,643,620
1944	619,576,240	63,701,363
1945	577,617,327	54,933,909
1946	533,922,068	60,506,873
1947	630,623,722	57,190,009
1948	599,518,229	57,139,948
1949	437,868,036	42,701,724
1950	516,311,053	44,076,703
1951	533,664,732	42,669,997

Source: U. S. Bureau of Mines

U. S. COAL CONSUMPTION

In Short Tons, Bituminous, Anthracite

	Bituminous	Anthracite
1931	371,989,000	58,400,000
1932	306,917,000	50,500,000
1933	321,748,000	49,600,000
1934	347,043,000	55,500,000
1935	360,292,000	51,100,000
1936	422,795,000	53,200,000
1937	432,603,000	50,400,000
1938	338,066,000	45,200,000
1939	377,773,000	49,700,000
1940	432,757,000	49,000,000
1941	494,088,000	52,700,000
1942	542,214,000	56,500,000
1943	596,164,000	57,100,000
1944	591,830,000	59,400,000
1945	559,567,000	51,600,000
1946	500,388,000	53,900,000
1947	557,243,000	48,200,000
1948	536,672,000	50,200,000
1949	445,538,000	37,700,000
1950	454,202,000	39,900,000
1951	488,904,000	37,000,000

Source: U. S. Bureau of Mines

U. S. COAL EXPORTS

In Short Tons, Bituminous, Anthracite

	Bituminous	Anthracite
1931	12,126,299	1,779,308
1932	8,814,047	1,303,356
1933	9,038,947	1,034,582
1934	10,868,552	1,297,610
1935	9,742,430	1,606,549
1936	10,654,959	1,678,024
1937	13,144,676	1,914,173
1938	10,490,269	1,906,911
1939	11,590,478	2,590,000
1940	16,465,928	2,667,632
1941	20,740,471	3,380,189
1942	22,943,305	4,438,588
1943	25,836,208	4,138,660
1944	26,032,348	4,185,933
1945	27,941,857	3,681,247
1946	41,208,578	6,506,829
1947	68,666,963	8,609,995
1948	45,930,133	6,675,914
1949	27,842,056	4,942,670
1950	25,468,403	3,891,569
1951	56,726,000	5,959,175
1952[1]	39,247,690	3,462,641

[1] Latest figure

Source: U. S. Bureau of Mines

Coke: Steel plant, merchant and beehive oven production . . . Blast furnace coke receipts . . . Foundry, furnace coke prices.

3 RAW MATERIALS

PRODUCTION OF COKE IN THE U. S.

In Net Tons, Beehive and Byproduct Cokes

Year	Beehive	By-Product: Merchant Plants	By-Product: Furnace Plants	By-Product: Total	Total
1936	1,706,063	12,493,032	32,076,089	44,569,121	46,275,184
1937	3,164,721	13,076,539	36,134,209	49,210,748	52,375,469
1938	837,412	10,988,525	20,668,878	31,658,403	32,495,815
1939	1,444,328	11,070,506	31,811,807	42,882,313	44,326,641
1940	3,057,825	12,549,132	41,465,177	54,014,309	57,072,134
1941	6,704,156	13,494,509	44,987,913	58,482,422	65,186,578
1942	8,274,035	15,134,866	47,160,043	62,294,909	70,568,944
1943	7,933,387	14,750,033	48,992,643	63,742,676	71,676,063
1944	6,973,022	14,144,951	52,919,844	67,064,795	74,037,817
1945	5,213,893	13,390,116	48,695,172	62,094,288	67,308,181
1946	4,568,401	12,388,485	41,540,962	53,929,447	58,497,848
1947	6,687,301	13,897,699	52,860,850	66,758,549	73,445,850
1948	6,577,571	13,332,499	54,951,858	68,284,357	74,861,928
1949	3,414,948	12,112,922	48,109,559	60,222,481	63,637,429
1950	5,827,420	12,346,822	54,543,796	66,890,618	72,718,038
1951	7,343,530	13,190,550	58,796,622	71,987,172	79,330,702
1952[1]	3,500,531	8,774,020	36,515,074	45,289,094	48,789,625

[1] Nine months.

Source: U. S. Bureau of Mines

BLAST FURNACE COKE RECEIPTS

In Short Tons

	By-Product	Total, By-Product and Beehive
1929	40,577,068	45,488,149
1930	31,413,599	33,037,680
1931	18,448,986	18,916,835
1932	8,766,116	8,867,668
1933	13,110,485	13,262,408
1934	15,857,087	16,027,682
1935	20,815,385	20,934,821
1936	30,228,314	30,772,156
1937	34,730,491	36,751,989
1938	18,755,989	19,070,166
1939	30,640,220	31,498,557
1940	40,057,325	42,483,624
1941	44,646,004	50,454,325
1942	48,360,913	55,491,570
1943	50,885,639	57,690,160
1944	51,670,789	57,481,353
1945	46,910,622	51,002,921
1946	40,406,056	43,700,492
1947	52,268,441	57,636,505
1948	53,953,343	59,285,506
1949	48,653,821	51,514,853
1950	55,661,298	60,918,549
1951	81,026,046	67,440,987

Source: Bureau of Mines

CONNELLSVILLE FOUNDRY COKE

Net Ton at Oven, Monthly Review

	1940	1941*	1943*	1944	1945	1946
Jan.	$5.50	$5.75	$6.88	$8.06	$8.25	$9.00
Feb.	5.31	5.75	7.13	8.25	8.25	9.00
Mar.	5.25	5.85	7.38	8.25	8.25	9.00
Apr.	5.25	5.62	7.38	8.25	8.25	9.00
May	5.25	6.72	7.44	8.25	8.47	9.00
June	5.25	6.88	7.50	8.25	9.00	9.00
July	5.25	6.88	7.50	8.25	9.00	9.68
Aug.	5.25	6.88	7.50	8.25	9.00	8.50
Sept.	5.25	6.88	7.50	8.25	9.00	8.50
Oct.	5.25	6.88	7.50	8.25	9.00	8.50
Nov.	5.68	6.88	7.50	8.25	9.00	8.50
Dec.	5.75	6.88	7.50	8.25	9.00	8.50
Average	5.35	6.49	7.39	8.24	8.71	8.85

	1947	1948	1949	1950	1951	1952
Jan.	$8.50	$14.00	$16.94	$15.75	$17.25	$17.75
Feb.	8.38	14.00	16.75	15.75	17.25	17.75
Mar.	10.25	14.00	16.50	16.25	17.50	17.75
Apr.	10.65	14.00	16.50	15.25	17.75	17.75
May	11.25	14.00	16.38	16.25	17.75	17.75
June	11.25	16.00	16.25	16.25	17.75	17.75
July	12.75	16.50	16.13	16.25	17.75	17.75
Aug.	13.75	17.00	15.75	16.25	17.75	17.75
Sept.	13.75	17.00	15.75	16.25	17.75	17.75
Oct.	13.94	17.00	15.75	16.75	17.75	17.75
Nov.	14.00	17.00	15.75	16.75	17.75	17.75
Dec.	14.00	17.00	15.75	17.12	17.75	†17.75
Average	11.96	15.62	16.18	16.32	17.65	†17.75

* Price unchanged at $6.88 throughout 1942.
† Tentative.

CONNELLSVILLE FURNACE COKE

Net Ton at Oven, Monthly Review

	1940	1941	1942	1943*	1945*	1946
Jan.	$4.20	$5.50	$6.13	$6.00	$7.00	$7.50
Feb.	4.00	5.50	6.00	6.25	7.00	7.50
Mar.	4.00	5.52	6.00	6.50	7.00	7.50
Apr.	4.00	5.63	6.00	6.50	7.00	7.50
May	4.00	6.00	6.00	6.00	7.15	7.50
June	4.00	6.13	6.00	6.50	7.50	7.50
July	4.20	6.13	6.00	6.50	7.50	8.50
Aug.	4.63	6.13	6.00	6.50	7.50	8.75
Sept.	4.75	6.13	6.00	6.50	7.50	8.75
Oct.	4.75	6.13	6.00	6.50	7.50	8.75
Nov.	5.10	6.13	6.00	6.50	7.50	8.75
Dec.	5.38	6.13	6.00	6.60	7.50	8.75
Average	4.42	5.92	6.01	6.45	7.30	8.10

	1947	1948	1949	1950	1951	1952
Jan.	$8.75	$12.50	$16.56	$14.00	$14.25	$14.75
Feb.	8.88	12.50	15.25	14.00	14.25	14.75
Mar.	9.00	12.50	14.50	14.13	14.50	14.75
Apr.	9.60	12.50	14.50	14.25	14.75	14.75
May	10.50	12.50	14.38	14.25	14.75	14.75
June	10.50	12.70	14.25	14.25	14.75	14.75
July	11.40	13.68	14.25	14.25	14.75	14.75
Aug.	12.00	14.75	14.25	14.25	14.75	14.75
Sept.	12.00	15.00	14.25	14.25	14.75	14.75
Oct.	12.38	15.00	14.25	14.25	14.75	14.75
Nov.	12.50	15.00	14.20	14.25	14.75	14.75
Dec.	12.50	15.00	14.00	14.25	14.75	†14.75
Average	10.83	13.63	14.58	14.20	14.65	†14.75

* Price unchanged at $7.00 throughout 1944.
† Tentative.

U. S. FOREIGN COKE TRADE

In Short Tons

	Exports	Imports for Consumption
1930	1,003,866	132,674
1931	754,302	103,563
1932	630,151	117,275
1933	637,819	160,873
1934	942,785	160,934
1935	613,975	317,379
1936	670,312	329,957
1937	526,683	286,364
1938	485,571	135,240
1939	589,925	141,911
1940	804,095	112,550
1941	708,971	267,886
1942	839,582	108,782
1943	994,607	98,127
1944	866,835	63,004
1945	1,478,746	81,994
1946	1,231,327	52,188
1947	835,059	104,093
1948	706,190	161,400
1949	548,256	277,507
1950	397,846	437,585
1951	1,026,730	161,639
1952 (9 months)	634,489	199,852

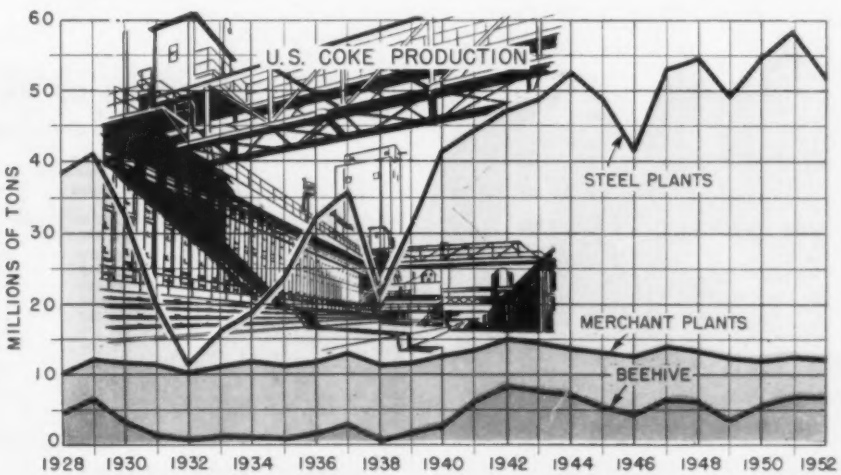
Source: U. S. Department of Commerce

BLAST FURNACE COKE

Consumption in Short Tons

1938	19,035,270
1939	31,422,272
1940	41,839,039
1941	49,469,972
1942	54,694,746
1943	56,701,419
1944	57,071,689
1945	50,653,221
1946	43,178,789
1947	57,147,844
1948	59,128,129
1949	51,356,817
1950	61,039,227
1951	66,623,206
1952*	52,460,000

* Estimate by THE IRON AGE.
Source: American Iron & Steel Institute



3 MATERIALS

Manganese ore: U. S. imports . . . U. S. mine shipments . . . World production of ores. Shipments of U. S. Manganiferous ores.

MANGANESE ORE, U. S. IMPORTS FOR CONSUMPTION

In Short Tons, Manganese Content 35 Pct and Over, Totals Include Small Producers, Not Listed

	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952*
Angola	.....	.....	.....	.....	.....	.....	.....	2,466	7,906	15,603	12,064
Belgian Congo	1,546	9,075	7,544	.....	.....	1,608	1,371	3,191	1,056	5,402	8,483
Brazil	147,906	168,234	88,899	115,916	38,985	70,234	71,561	88,164	60,453	44,242	56,039
Chile	2,113	7,893	2,885	42,699	65,222	19,930	4,927	6,836	3,748	11,150	5,464
Cuba	73,098	101,789	223,392	140,325	77,469	26,893	15,931	27,337	46,883	63,446	80,939
Egypt	.....	.....	.....	.....	.....	.....	.....	.....	24,272	13,240	.....
France	.....	.....	.....	.....	.....	.....	.....	101	1,289	.....	.....
French Morocco	.....	.....	.....	.....	.....	.....	.....	186	11,419	20,258	20,755
Gold Coast	95,698	112,700	82,408	108,747	144,275	112,102	112,503	138,566	134,469	145,338	85,073
Greece	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,189	532
Indonesia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,887
India	301,777	231,596	172,385	103,586	160,958	140,007	152,852	172,503	314,907	294,347	204,156
Iran	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,426	.....
Mexico	16,270	26,662	35,610	22,240	18,570	22,805	23,894	23,769	15,390	43,305	32,841
Philippines	.....	.....	.....	.....	.....	1,141	5,099	6,944	2,663	5,830	3,066
Turkey	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,213	6,699
Union of South Africa	110,093	58,812	19,028	29,544	113,037	87,154	130,114	131,319	218,115	180,509	79,797
U.S.S.R.	9,200	2,341	.....	70,082	121,753	141,975	182,455	71,357	31,631	1,282	.....
Total Imports†	766,399	729,305	633,197	633,859	740,277	624,431	702,211	673,668	874,201	844,899	619,597

* Nine months.

† Total import figures include small imports from minor producing countries not otherwise listed.

Source: Department of Commerce

U. S. MANGANESE ORES

Shipped by U. S. mines, Metallurgical*

State	1942	1943	1944	1945	1946
Ala.	26	.....	49	32	.....
Ariz.	2,946	5,779	8,519	1,093	.....
Ark.	4,132	5,319	7,109	6,663	1,101
Calif.	10,112	20,604	21,540	1,668	.....
Colo.	513	707	.....	.....	.....
Ga.	4,890	2,467	1,135	1,056	.....
Idaho	.....	36	.....	.....	.....
Mo.	239	180	.....	.....	.....
Mont.	120,409	130,789	153,665	143,888	129,227
Nev.	6,112	10,451	21,799	960	1,064
N. Mex.	1,267	469	273	3,334	1,166
N. C.	.....	140	.....	.....	.....
Okla.	31	265	.....	.....	.....
Oreg.	45	143	.....	.....	.....
S. C.	.....	312	1,400	41	78
So. Dak.	81	12	.....	.....	.....
Tenn.	2,247	2,501	418	.....	.....
Utah	970	91	30	.....	.....
Va.	11,024	7,040	20,034	8,566	321
Wash.	10,660	7,731	5,199	6,994	1,424
W. Va.	2,240	.....	.....	.....	.....
Wyo.	.....	60	.....	.....	.....
Total	177,966	195,096	241,170	174,295	134,381

State	1947	1948	1949	1950	1951
Ala.	.....	.....	.....	136	.....
Ariz.	133	240	223	222	.....
Ark.	841	212	2,851	1,224	3,720
Calif.	.....	.....	280	37	.....
Colo.	.....	.....	.....	.....	.....
Ga.	.....	.....	.....	.....	.....
Idaho	.....	.....	.....	.....	.....
Mo.	.....	.....	.....	.....	.....
Mont.	123,490	119,339	107,399	119,694	90,803
Nev.	67	.....	.....	.....	241
N. Mex.	858	.....	.....	1,320	.....
N. C.	.....	.....	.....	.....	.....
Okla.	.....	.....	.....	.....	.....
Oreg.	.....	.....	.....	.....	.....
S. C.	.....	.....	.....	.....	.....
So. Dak.	.....	.....	.....	.....	.....
Tenn.	39	37	175	133	.....
Utah	.....	.....	.....	120	.....
Va.	.....	.....	.....	56	.....
Wash.	.....	.....	.....	.....	.....
W. Va.	.....	.....	.....	.....	.....
Wyo.	.....	.....	.....	.....	.....
Total	125,428	119,828	110,928	122,944	†94,793

* In short tons.
† Preliminary.

Source: U. S. Bureau of Mines

WORLD PRODUCTION OF MANGANESE ORE

In Metric Tons, Includes Pct Manganese, World Total, Through 1951

	Percent Mn	1944	1945	1946	1947	1948	1949	1950	1951
U.S.S.R. (estimate)	41–48	461,000	2,251,000	1,700,000	1,800,000	1,900,000	1,500,000	2,000,000	2,500,000
Gold Coast	50†	479,499[4]	713,013[4,5]	777,583[4,5]	598,655[4,5]	640,088[5]	752,963	722,784	819,018[5]
India	47–52	376,251	213,602	256,975	350,000	318,220[5]	656,190	897,100	1,179,680
Union of South Africa	30–51	106,883	114,546	237,897	288,213	276,393	655,175	790,937	758,870
Brazil (exports)	38–50	146,983	244,649	149,149	142,092	141,253	149,896	148,339	90,000[7]
United States (shipments)	35†	224,632	165,412	130,303	119,409	118,931	114,427	127,188	94,793
Morocco, French	32–50	27,550	45,292	57,080	109,452	214,412	233,830	287,265	372,233
Cuba	36–50†	257,864[4]	198,243	130,764	50,397	29,073	62,503	79,209	154,091
Japan[2]	32–40	400,679	85,700	29,394	33,194	47,500	100,000	134,066	196,260
Mexico	41–45	80,671	51,959	25,000	31,400	53,800	53,900[7]	32,400[7]	66,100
Chile	40–50	43,989	7,445	20,538	19,352	20,498	27,758	33,530	42,000[7]
World Total[1]		2,900,000	4,260,000	3,700,000	3,800,000	3,900,000	4,306,640	5,252,818	6,274,785

† Total world production figures include production of smaller producing countries not otherwise listed and estimates by the Bureau of Mines for countries not reporting.
[2] Preliminary figures.
[3] Estimate excludes Ukraine.
[4] Dry weight.
[5] Exports.
[6] Data not available, estimate included in total.
[7] Estimate.

Source: U. S. Bureau of Mines

SHIPMENTS OF MANGANIFEROUS ORES

By U. S. Producers in Short Tons, Metallurgical and Battery Ores

Year	Metallurgical Ore: Manganese Ore (35 Pct or more Mn)	Ferruginous Manganese Ore (10 to 35 Pct Mn)	Manganiferous Iron Ore (5 to 10 Pct Mn)	Manganiferous Zinc Residuum	Battery Ore (35 Pct or more Mn)
1939	20,810	268,289	526,067	144,747	8,899
1940	30,416	358,406	914,526	172,990	10,383
1941	73,852	512,162	918,725	262,049	11,399
1942	177,966	265,653	1,500,613	292,051	15,419
1943	195,096	468,862	1,251,275	270,328	*12,704
1944	241,170	296,981	1,190,476	247,402	8,224
1945	174,295	114,327	1,408,527	224,331	8,042
1946	134,381	100,402	1,070,694	205,766	8,295
1947	125,428	128,562	1,044,961	227,547	6,188
1948	119,828	139,580	1,198,523	291,383	10,845
1949	110,928	24,885	1,052,231	158,902	14,983
1950	122,944	115,269	972,328	183,842	11,507
1951	94,793	105,894	1,047,897	267,751	9,792

* Includes 2,731 tons containing 27 pct Mn.

Source: U. S. Bureau of Mines

Prices, output, shipments: Ferrosilicon, chromite, ferromanganese, spiegeleisen.

RAW MA 3

FERROMANGANESE, 80 PCT

Eastern Producers, Carloads, Gross Ton†

	1936	1937	1938	1939	1940*	1942**
Jan.	$75.00	$80.00	$102.50	$85.00	$100.00	$120.00
Feb.	75.00	80.00	102.50	80.00	100.00	120.00
March	75.00	89.00	102.50	80.00	100.00	120.00
April	75.00	95.00	102.50	80.00	100.00	120.00
May	75.00	100.62	102.50	80.00	100.00	135.00
June	75.00	102.50	102.50	80.00	110.00	135.00
July	75.00	102.50	92.50	80.00	120.00	135.00
August	75.00	102.50	92.50	80.00	120.00	135.00
Sept.	75.00	102.50	92.50	95.00	120.00	135.00
October	75.00	102.50	92.50	100.00	120.00	135.00
Nov.	80.00	102.50	92.50	100.00	120.00	135.00
Dec.	80.00	102.50	92.50	100.00	120.00	135.00
Average	75.83	96.84	97.50	86.67	110.84	130.00

	1947**	1948	1949	1950	1951	1952
Jan.	$135.00	$145.00	$161.40	$173.40	$185.24	$186.25
Feb.	135.00	145.00	161.40	173.40	186.25	186.25
March	135.00	145.00	169.35	173.40	186.25	186.25
April	135.00	145.00	173.40	173.40	186.25	186.25
May	135.00	145.00	173.40	173.40	186.25	186.25
June	135.00	145.00	173.40	173.40	186.25	186.25
July	135.00	145.00	173.40	173.40	186.25	186.25
August	135.00	145.00	173.40	173.40	186.25	216.25
Sept.	135.00	145.00	173.40	173.40	186.25	226.25
October	145.00	162.00	173.40	173.40	186.25	226.25
Nov.	145.00	162.00	173.40	178.60	186.25	226.25
Dec.	145.00	162.00	173.40	181.20	186.25	226.25
Average	137.50	149.25	171.08	174.48	186.16	202.08

† Seaboard price prior to October 7, 1948.
* Price unchanged at $120.00 through 1941.
** Price unchanged at $135.00 from 1943 through 1946.

50 PCT FERROSILICON

Carloads per Gross Ton, Delivered†

	1939*	1940**	1943*	1944	1945	1946
Jan.	$69.50	$69.50	$74.50	$6.65	$6.65	$6.65
Feb.	69.50	69.50	74.50	6.65	6.65	6.65
March	69.50	69.50	74.50	6.65	6.65	6.65
April	69.50	69.50	74.50	6.65	6.65	6.65
May	69.50	69.50	74.50	6.65	6.65	6.65
June	69.50	72.00	74.50	6.65	6.65	6.65
July	69.50	74.50	6.65	6.65	6.65	7.05
Aug.	69.50	74.50	6.65	6.65	6.65	7.05
Sept.	69.50	74.50	6.65	6.65	6.65	7.05
Oct.	69.50	74.50	6.65	6.65	6.65	7.05
Nov.	69.50	74.50	6.65	6.65	6.65	7.05
Dec.	69.50	74.50	6.65	6.65	6.65	7.05
Average	69.50	72.11	6.65	6.65	6.65	6.85

	1947	1948	1949	1950	1951	1952
Jan.	$7.45	$9.80	$11.30	$11.30	$12.40	$12.40
Feb.	7.45	9.80	11.30	11.30	12.40	12.40
March	7.45	9.80	11.30	11.30	12.40	12.40
April	7.80	9.80	11.30	11.30	12.40	12.40
May	7.80	9.80	11.30	11.30	12.40	12.40
June	7.80	9.80	11.30	11.30	12.40	12.40
July	7.80	9.80	11.30	11.30	12.40	12.40
Aug.	7.80	9.80	11.30	11.30	12.40	12.40
Sept.	7.80	9.80	11.30	11.30	12.40	12.40
Oct.	8.80	10.50	11.30	11.30	12.40	12.40
Nov.	8.80	10.50	11.30	12.00	12.40	12.40
Dec.	9.18	10.50	11.30	12.20	12.40	12.40
Average	7.99	9.98	11.30	11.43	12.40	12.40

† Cents per lb of contained Si, since July 1943. Delivered east of Mississippi only, prior to October 7, 1948.
* Price unchanged at $69.50 throughout 1938.
** Price unchanged at $74.50 throughout 1941 and 1942.

SPIEGELEISEN, 19 TO 21 PCT.

Palmerton, Pa., Carloads, Gross Ton

	1936	1937	1938	1939	1940*	1948*
Jan.	$26.00	$26.00	$33.00	$28.00	$32.00	$38.00
Feb.	26.00	26.00	33.00	28.00	32.00	38.00
March	26.00	28.40	33.00	28.00	32.00	38.00
April	26.00	30.00	33.00	28.00	32.00	38.00
May	26.00	32.25	33.00	28.00	32.00	38.00
June	26.00	33.00	33.00	28.00	34.40	38.00
July	26.00	33.00	28.00	28.00	36.00	38.00
August	26.00	33.00	28.00	28.00	36.00	38.00
Sept.	26.00	33.00	28.00	31.00	36.00	38.00
October	26.00	33.00	28.00	32.00	36.00	38.00
Nov.	26.00	33.00	28.00	32.00	36.00	38.00
Dec.	26.00	33.00	28.00	32.00	38.00	40.00
Average	26.00	31.14	30.50	29.25	34.20	38.50

	1947	1948	1949	1950	1951	1952
Jan.	$40.00	$47.00	$62.00	$65.00	$75.00	$75.00
Feb.	40.00	47.00	62.00	65.00	75.00	75.00
March	42.00	48.00	63.20	65.00	75.00	75.00
April	44.00	52.00	65.00	65.00	75.00	75.00
May	44.00	52.00	65.00	65.00	75.00	75.00
June	44.00	52.00	65.00	65.00	75.00	75.00
July	44.00	52.00	65.00	65.00	75.00	75.00
August	46.25	53.00	65.00	65.00	75.00	82.50
Sept.	47.00	60.75	65.00	67.50	75.00	85.00
October	47.00	62.00	65.00	70.00	75.00	85.00
Nov.	47.00	62.00	65.00	70.00	75.00	85.00
Dec.	47.00	62.00	65.00	72.50	75.00	85.00
Average	44.35	54.15	64.35	66.66	75.00	78.96

* Price unchanged at $38.00 from 1941 through 1945.

WORLD PRODUCTION OF CHROMITE

In Metric Tons

	1943	1944	1945	1946	1947	1948	1949	1950	1951
Union of South Africa	163,232	88,909	99,090	212,253	373,094	412,783	404,351	496,324	545,306
U.S.S.R.	325,000	300,000	300,000	300,000	500,000	600,000	350,000[1]	500,000	600,000[1]
Philippines, Rep. of	60,000[1]	70,000[1]	(3)	58,930	195,185	256,854	246,744	250,511[4]	334,571
Pakistan	.....	.....	.....	.....	.....	.....	.....	18,416	18,006
Cuba	354,152	192,131	172,626	174,350	159,209	116,624	97,368	65,820	79,065
Southern Rhodesia	287,453	277,051	186,318	151,433	155,149	230,703	243,506	291,525	300,257
Turkey	154,512	182,108	146,716	103,167	102,875	285,353	434,117	420,792	602,220
New Caledonia	46,952	55,229	59,828	24,946	50,530	75,021	88,792	84,801	88,386
India	33,789	40,190	31,642	45,511	35,274	22,917	19,728	16,998	11,000[1]
Sierra Leone	16,306	9,851	578	10,301	16,769	7,886	22,101	7,518	(3)
Greece	15,500	18,295	2,413	9,062	2,640	1,500	3,381	12,631	23,268
Cyprus (exports)	7,986	469	1,070	1,158	5,283	6,899	14,875	18,441	12,653
Yugoslavia[1]	65,000	10,000	6,000	68,000	55,000	65,000	93,000	115,200	107,000
Bulgaria	5,000	5,000	.....	.....	(3)	(3)	(3)	(3)	(3)
Guatemala	.....	.....	.....	.....	.....	.....	.....	289	1,138
Canada	26,848	24,543	5,221	2,821	1,961	1,556	347	(3)	.....
Japan[5]	58,520	71,135	28,539	7,079	2,407	9,340	27,003	31,953	40,407
United States	145,259	41,394	12,676	3,726	860	3,283	393	367	6,401
Albania	31,091[1]	.....	.....	.....	.....	16,500[1]	(3)	(3)	(3)
Brazil (exports)	7,813	4,721	1,490	174	(2)	1,626	(3)	(3)	(3)
Total World Production[1]	1,825,000	1,400,000	1,100,000	1,200,000	1,700,000	2,150,000	2,100,000	2,331,586	2,769,688

[1] Estimate.
[2] Planned production.
[3] Data not available.
[4] Exports.
[5] Preliminary.
[6] Jan. to Sept. inclusive.

Source: U. S. Bureau of Mines

CHROMITE ORE SHIPMENTS

In Short Tons, Shipments by U. S. Mines

1919	5,688	1936	301
1920	2,802	1937	2,600
1921	316	1938	909
1922	398	1939	4,048
1923	254	1940	2,982
1924	323	1941	14,259
1925	121	1942	112,876
1926	158	1943	160,120
1927	225	1944	45,629
1928	739	1945	13,973
1929	301	1946	4,107
1930	90	1947	948
1931	300	1948	3,619
1932	174	1949	433
1933	944	1950	404
1934	413	1951	7,051
1935	577	1952*	10,095

* Preliminary for nine months.

Source: Bureau of Mines

CHROMITE IMPORTS FOR CONSUMPTION

In Shot Tons, Cr_2O_3 Content, By U. S. (Metallurgical Grade)

	1945	1946	1947	1948	1949	1950	1951	1952*
Brazil	1,272	.....	.....	860	.....	.....	.....	.....
British West Africa	.....	14,164	8,968	3,481	4,122	4,637	3,400	7,829
Canada	1,804	4,090	34	82	.....	365	.....	.....
Cuba	103,482	73,129	59,399	57,813	32,221	4,693	1,080	9,343
Cyprus	.....	.....	.....	2,509	.....	.....	.....	.....
French Pacific Isles	.....	.....	.....	.....	.....	30,198	30,190	16,891
Guatemala	.....	.....	.....	.....	.....	378	.....	755
India	.....	5,500	5,065	.....	3,837	850	2,668	1,910
Mozambique	.....	.....	.....	.....	.....	6,910	1,193	.....
New Caledonia	17,806	11,326	10,185	24,884	36,969	.....	.....	.....
Pakistan	.....	.....	.....	.....	.....	3,992	.....	1,408
Philippines	.....	10,469	71,793	81,669	102,008	28,947	1,194	13,957
Southern Rhodesia	104,048	47,228	36,402	59,620	44,531	62,338	80,040	58,060
Turkey	34,829	4,328	28,854	119,646	131,634	91,889	120,027	133,246
Union of South Africa	48,265	105,831	118,448	133,498	122,001	17,712	20,720	25,208
U.S.S.R.	86,378	53,391	136,021	190,118	51,424	31,067	.....	.....
Yugoslavia	.....	.....	10,824	5,863	4,844	4,367	9,174	5,416
Total Imports	400,742	322,456	485,991	680,723	533,591	281,433	269,686	274,643

* Nine months.

Source: Department of Commerce

3 RAW MATERIALS

Refractory brick prices: Silica, fire clay, chemically bonded and magnesite brick . . . Production of spiegeleisen, ferrosilicon.

PRODUCTION OF SPIEGELEISEN

In Short Tons, U. S. Output

1931	75,936	1943	149,036
1932	41,795	1944	165,530
1933	29,885	1945	139,039
1934	51,261*	1946	111,696
1936	106,553	1947	134,329
1937	151,161*	1948	112,610
938	12,688	1949	78,167
1939	102,470	1950	42,375
1940	114,119	1951	77,017
1941	177,915	1952**	37,485
1942	186,026		

* Shipments from mines.
** Six Months. Source: U. S. Bureau of Mines

FERROMANGANESE SHIPMENTS

By U. S. Furnaces, in Short Tons

1932	78,867	1943	722,658
1933	142,747	1944	715,059
1934	165,701	1945	610,376
1935	217,982	1946	493,808
1936	361,035	1947	614,647
1937	403,023	1948	659,193
1938	250,566	1949	560,180
1939	322,227	1950	731,421
1940	503,291	1951	795,745
1941	619,395	1952*	395,473
1942	659,219		

* Six Months. Source: U. S. Bureau of Mines

CHEMICALLY BONDED MAGNESITE BRICK

Per Short Ton, Baltimore, F.o.b. Plant

	1947	1948	1949	1950	1951	1952
Jan.	$65.00	$75.00	$80.00	$80.00	$93.00	$93.00
Feb.	65.00	75.00	80.00	80.00	93.00	93.00
Mar.	69.00	75.00	80.00	80.00	93.00	93.00
Apr.	70.00	75.00	80.00	80.00	93.00	93.00
May	70.00	75.00	80.00	80.00	93.00	93.00
June	70.00	75.00	80.00	80.00	93.00	93.00
July	70.00	76.00	80.00	80.00	93.00	93.00
Aug.	70.00	80.00	80.00	83.00	93.00	93.00
Sept.	70.00	80.00	80.00	83.00	93.00	93.00
Oct.	70.00	80.00	80.00	86.00	93.00	93.00
Nov.	70.00	80.00	80.00	88.00	93.00	93.00
Dec.	74.00	80.00	80.00	88.00	93.00	93.00
Average	69.00	77.00	80.00	82.08	93.00	93.00

FERROSILICON IMPORTS FOR CONSUMPTION

In Short Tons, Silicon Content

1934	1,102	1944	4,189
1935	875	1945	7,191
1936	590	1946	1,331
1937	2,269	1947	2,141
1938	701	1948	734
1939	1,160	1949	931
1940	1,235	1950	3,785
1941	6,190	1951	11,160
1942	4,337	1952*	1,668
1943	901		

* Nine Months. Source: U. S. Bureau of Mines

FERROSILICON PRODUCTION

By U. S. Furnaces, in Short Tons

1935	294,856*	1945	660,403
1936	329,774	1946	614,422
1937	405,989	1947	769,653
1938	279,807	1948	814,297
1939	313,560	1949	647,981
1940	409,699	1950	742,407
1941	618,227	1951	861,889
1942	712,710	1952†	607,717
1943	818,351		
1944	700,358		

* Shipments.
† Nine Months. Source: U. S. Bureau of Mines

FIRST QUALITY FIRE CLAY BRICK

Pa.,* Ky., Mo., Ill., Md., Ohio, F.o.b. Plant**

	1946	1947	1948§	1950	1951	1952
Jan.	$54.40	$65.00	$73.00	$86.00	$94.60	$94.60
Feb.	54.40	65.00	73.00	86.00	94.60	94.60
Mar.	54.40	65.00	73.00	86.00	94.60	94.60
Apr.	58.90	66.00	73.00	86.00	94.60	94.60
May	60.40	70.00	73.00	86.00	94.60	94.60
June	60.40	70.00	73.00	86.00	94.60	94.60
July	60.40	70.00	74.00	86.00	94.60	94.60
Aug.	60.40	70.00	80.00	86.00	94.60	94.60
Sept.	60.40	70.00	80.00	86.00	94.60	94.60
Oct.	64.08	70.00	80.00	91.16	94.60	94.60
Nov.	65.00	70.00	80.00	94.60	94.60	94.60
Dec.	65.00	72.00	80.00	94.60	94.60	94.60
Average	59.85	69.00	76.00	88.03	94.60	94.60

§ Price unchanged at $80.00 through 1949.
* Add $5.00 for Salina, Pa., after May, 1949.
** Carloads, per 100 brick.

SILICA BRICK STANDARD GRADE PRICES

Mt. Union, Pa., Ensley, Ala., Carloads per 1000 Brick, F.o.b. plant

	1945†	1946	1947	1948	1949	1950	1951	1952
January	$51.30	$54.40	$65.00	$73.00	$80.00	$86.00	$94.60	$94.60
February	51.69	54.40	65.00	73.00	80.00	86.00	94.60	94.60
March	52.85	54.40	65.00	73.00	80.00	86.00	94.60	94.60
April	52.85	58.90	66.00	73.00	80.00	86.00	94.60	94.60
May	52.85	60.40	70.00	73.00	80.00	86.00	94.60	94.60
June	52.85	60.40	70.00	73.00	80.00	86.00	94.60	94.60
July	52.85	60.40	70.00	74.00	80.00	86.00	94.60	94.60
August	52.85	60.40	70.00	80.00	80.00	86.00	94.60	94.60
September	54.45	60.40	70.00	80.00	80.00	86.00	94.60	94.60
October	54.44	64.08	70.00	80.00	80.00	91.16	94.60	94.60
November	54.40	65.00	70.00	80.00	80.00	94.60	94.60	94.60
December	54.40	65.00	72.00	80.00	80.00	94.60	94.60	94.60
Average	53.15	59.85	69.00	76.00	80.00	88.03	94.60	94.60

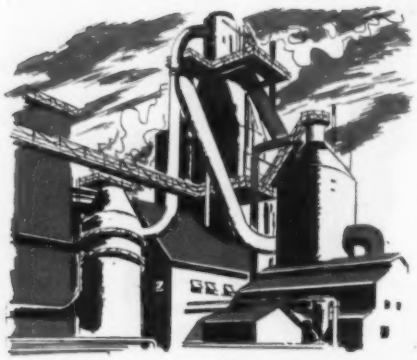
† Price unchanged at $51.30 from 1942 through 1944.

CHEM. BONDED CHROME BRICK

Baltimore, F.o.b. Plant, Per Short Ton

	1947*	1948	1949	1950	1951	1952
Jan.	$54.00	$64.00	$69.00	$69.00	$82.00	$82.00
Feb.	54.00	64.00	69.00	69.00	82.00	82.00
Mar.	58.00	64.00	69.00	69.00	82.00	82.00
Apr.	59.00	64.00	69.00	69.00	82.00	82.00
May	59.00	64.00	69.00	69.00	82.00	82.00
June	59.00	64.00	69.00	69.00	82.00	82.00
July	59.00	65.00	69.00	69.00	82.00	82.00
Aug.	59.00	69.00	69.00	71.40	82.00	82.00
Sept.	59.00	69.00	69.00	72.00	82.00	82.00
Oct.	59.00	69.00	69.00	75.00	82.00	82.00
Nov.	59.00	69.00	69.00	77.00	82.00	82.00
Dec.	63.00	69.00	69.00	77.00	82.00	82.00
Average	59.00	66.00	69.00	7..28	82.00	82.00

* Price unchanged at $54.00 from 1942 through 1946.



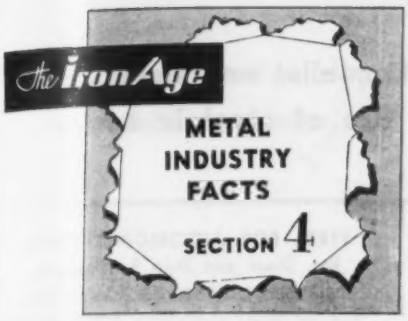
BURNED MAGNESITE BRICK

Baltimore, F.o.b. Plant, short ton

	1947*	1948	1949	1950	1951	1952
Jan.	$76.00	$86.00	$91.00	$91.00	$104.00	$104.00
Feb.	76.00	86.00	91.00	91.00	104.00	104.00
Mar.	80.00	86.00	91.00	91.00	104.00	104.00
Apr.	81.00	86.00	91.00	91.00	104.00	104.00
May	81.00	86.00	91.00	91.00	104.00	104.00
June	81.00	86.00	91.00	91.00	104.00	104.00
July	81.00	87.00	91.00	91.00	104.00	104.00
Aug.	81.00	91.00	91.00	93.40	104.00	104.00
Sept.	81.00	91.00	91.00	94.00	104.00	104.00
Oct.	81.00	91.00	91.00	97.00	104.00	104.00
Nov.	81.00	91.00	91.00	98.00	104.00	104.00
Dec.	85.00	91.00	91.00	99.00	104.00	104.00
Average	80.00	88.00	91.00	93.28	104.00	104.00

* Price unchanged at $76.00 from 1942 through 1946.

If you've missed the "Review and Forecast" section, you'll want to turn back to p. 273 for a terse, concise roundup of the major 1952 developments in the metalworking industry, plus the trends to watch this year.



METAL PRODUCTS

APPLIANCES • TRANSPORTATION • CONSTRUCTION

IN THIS SECTION:

APPLIANCES
- Cooking 444, 445, 446
- Heating 444, 445, 446
- Household 444, 445, 446

AUTO INDUSTRY
- Bus Production 438
- Materials Used 439
- Production 440
- Steel Consumption 438
- Steel shipped to 440
- Wages 440

BUSINESS (MFG., WHSL., RTL.) 448

CAR LOADINGS (R. R. FREIGHT) 444

CONSTRUCTION 447

CONSUMER EXPENDITURES 448

CONSUMPTION, STEEL
- Automobile Industry 438, 439
- Containers 438
- Electric Appliances 438
- Houses 438
- Pianos 439
- R. R. Freight Cars 441
- R. R. Passenger Cars 440
- Refrigerators 439

CONTAINERS, USE OF STEEL 438

ELECTRIC POWER 445

EMPLOYMENT
Hours, Earnings, Rates
- Aircraft 443
- Appliances 445
- Automobile Industry 440
- Railroads 443
- R. R. Equipment 440
- Shipbuilding 443

EXPENDITURES 447, 448

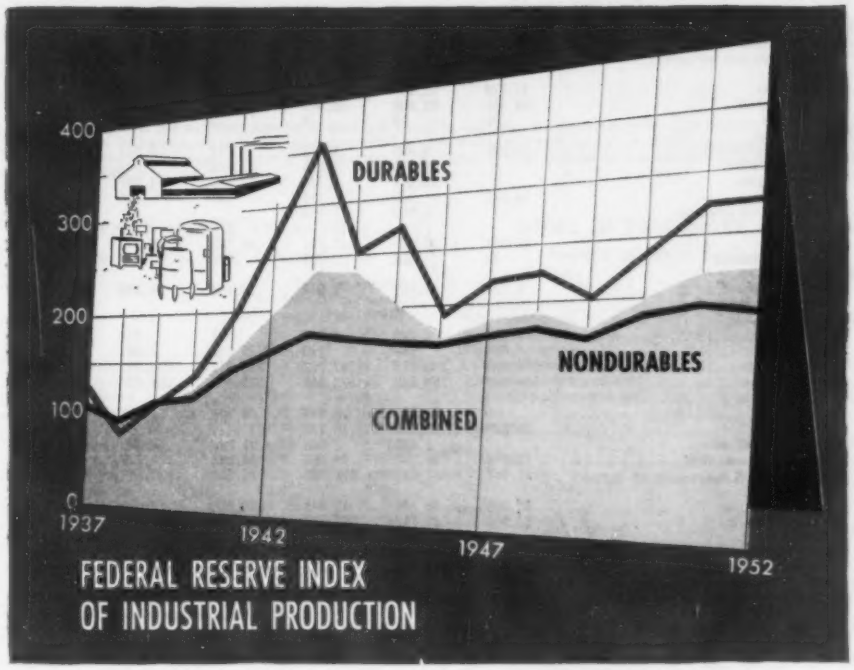
FABRICATED STRUCTURAL STEEL BOOKINGS 441

FARM MACHINERY, MANUFACTURED 442

HARDWARE, RETAIL 446

HOMES 438

HOUSING, NEW 447



FEDERAL RESERVE INDEX OF INDUSTRIAL PRODUCTION

INCOME, DISPOSITION OF .. 444

INVENTORIES 448

LOCOMOTIVES, ORDERS ... 440

MACHINERY, FARM 442

MOTORS AND GENERATORS 445

ORDERS
- Locomotives 440
- Motors and Generators 445
- R. R. Passenger Cars 442

PIANOS, USE OF STEEL 439

PLANT EXPENDITURES 447

PRODUCTION
- Electric Power 445
- Farm Machinery 442
- Industrial Index 443
- Motor Vehicles 440
- New Housing 447
- Trucks and Trailers 443

RADIO AND TV 445

REFRIGERATORS 439, 446

R. R. FREIGHT CARS ... 441, 442

R. R. PASSENGER CARS 440, 442

SALES
- Electric Appliances Index 445
- Hardware, Retail 446
- Household, Appliances 446
- Mfg., Whlsl., Retl. 448
- Refrigerators, Household 444
- Vacuum Cleaners 445

SHIPBUILDING, MERCHANT, OF WORLD 442

SHIPMENTS
- Cooking Appliances 444
- Heating Appliances 444
- Steel, for autos 440

STEEL
- Appliance Mfrs. use of 438
- Construction 438, 439, 440, 441
- Shipments 440, 444
- Structural Bookings 441

TRUCK TRAILERS 443

VACUUM CLEANERS 445

4 METAL PRODUCTS

Steel used in automobiles and electrical appliances . . . Use of steel in homes

STEEL PRODUCTS USED IN ELECTRICAL APPLIANCES

Shipments to Electric Appliance Industry Shown in Net Tons From 1947†

Item	1947	1948	1949	1950	1951	1952 9 Months
Ingots, blooms, billets, slabs, sheet bars, and seamless tube rounds	2,092	99	7	236	1,926	.....
Wire rods	465	178	142	127	139	46
Structural shapes	1,376	3,321	1,890	1,237	1,327	948
Plates (sheared and universal)	10,417	8,915	6,205	7,428	5,970	3,415
Bars:						
Hot-rolled	14,716	12,567	9,648	16,375	13,734	8,309
Cold-finished	44,412	53,609	33,941	47,163	38,460	19,626
Tool steel	35	19	4	3	.....	1
Pipe and tubes:						
Mechanical tubing	10,359	5,493	3,818	7,212	9,323	6,283
Pressure tubing		6,039	2,996	7,888	3,543	5,283
Standard pipe		13,567	8,756	12,380	11,057	5,004
Line pipe	16,371	382	114	459	206	69
Misc. tubular products		2,910	1,156	.....	.....	.....
Wire:						
Drawn	21,744	30,741	24,512	38,743	28,392	12,909
Nails and staples	47	559	269	472	638	103
Black plate:						
Ordinary	8,738	10,699	6,914	10,885	9,300	4,614
Chemically treated	12	8	.....			
Tin and terneplate:						
Hot dipped	1,237	1,696	1,470	861	721	118
Electrolytic	1,938	548	290	849	1,307	503
Hot-rolled sheets	307,067	363,015	197,288	301,818	235,052	64,999
Cold-rolled sheets	534,642	758,649	575,563	915,799	858,778	475,407
Galvanized sheets:						
Hot-dipped		39,686	29,149	74,126	54,488	32,151
Electrolytic	70,939	26,048	16,123			
Coated sheets—all other		2,423	2,008	21,285	27,233	12,179
Electrical sheets and strip	3,316	26,240	14,663	34,063	24,776	8,761
Enameling sheets	147,767	187,482	112,733	173,655	128,393	70,335
Strip:						
Hot-rolled	32,045	28,790	17,643	22,963	17,418	8,524
Cold-rolled	63,288	98,888	100,937	119,729	109,373	54,938
All other	.....	3	.....	.....	.....	.....
Total steel products	1,293,023	1,682,618	1,168,239	1,815,756	1,581,554	794,533

† Includes cooking stoves and ranges, refrigerators, washing machines and ironers, and other household appliances.
Source: American Iron & Steel Institute

U. S. BUS PRODUCTION

Number of Units, 1940-1952

1952*	6,350
1951	9,460
1950	4,908
1949	5,511
1948	12,299
1947	19,110
1946	10,091
1941	7,626
1940	6,147

* Estimated. Source: Automobile Mfrs. Assn.

Major trade and manufacturing associations whose products are represented in this section are listed and indexed beginning on p. 470. Coming meetings on p. 477.

USE OF STEEL IN HOMES

Some Steel Items In Six-Room House

	Lb.
Metal Lath	1000
Gas, water and heating pipe	1200
Steel window frames (16 at 50 lb each)	800
Kitchen equipment	800
Stove, refrigerator, sink, table top, kitchen cabinets, ventilators, washing machine, steel tile	
Structural shapes and columns	680
Heating equipment	640
Steel furnace, hot water tank, fuel oil tank	
Nails and miscellaneous wire	600
Door frames and sills	480
Gutters and downspouts	475
Bathroom	300
Bathtub, lavatory, medicine cabinet, shower cabinet, toilet (porcelain)	
Flashing and miscellaneous sheets	200
Steel doors (fire protection)	160
Electrical steel conduit	140
Hardware	90
Locks, knobs, hinges	
Radiator grilles	75
Screens	32
Laundry tubs	10
Total* Lb.	8482

* Some of the items may be lacking in some homes, or may be fashioned of other materials so that the total weight may be less than that which is given.

Source: American Iron & Steel Institute

STEEL USED IN A CONTAINER

Can Steel Weights

Can Types	Gross Weight Used, oz
Paint (1 gal)	15.968
Fruit juice (No. 10)	11.080
Lard (3 lb)	8.288
Vegetable (No. 5)	5.920
Fruit (No. 3)	5.344
Olive oil (square 1 qt)	4.960
Soup (No. 2)	3.808
Grease (1 lb)	3.776
Fish (Tuna No. 1)	3.168
Meat (Square 12 oz)	2.848
Fish (Sardine No. 1 flat)	2.500
Condensed milk	2.480
Baby food	1.888

Note: Can weights are finished weights of the steel content.

Source: American Iron & Steel Institute

STEEL USED BY AUTO INDUSTRY

Production Level Estimates

Number of Cars and Trucks Produced	Estimated Total Steel and Strip Required (net tons)	Estimated Total Steel, All Types Required (net tons)
4,000,000	4,420,000	7,180,000
5,000,000	5,520,000	8,980,000
6,000,000	6,630,000	10,780,000

Source: THE IRON AGE

STEEL FOR AUTOMOBILE PARTS

Bar, Sheet and Strip Requirements

Estimates by THE IRON AGE, based on reports of steel sizes ordered from the mill. Passenger cars differ greatly in size, weight and design. It is not practical to compute averages on the basis of the data given below. The tables, do, however, give an indication of the specific steel requirements of auto plants for certain applications. The tables were compiled from data furnished by several auto producers and their steel suppliers. Some auto parts, oil pans and bumpers, for example, are made of more than one type of steel and the steel may be ordered double width.

	Typical Width, Inches	Gross Weight, lb
Cold-rolled sheet and strip—19 and 20 gage:		
Top	68–84	80–112
Hood top	43–72	80–80
Front fender	45–52	72–80[1]
Rear fender	42	80[1]
Quarter panel	45–59	72–90
Rear deck lid	39–47	44–62
Doors	35–50	36–54[2]
Bumpers	15–24	90 Max.
Oil pan	24	9
Hot-rolled sheet and strip—up to 18 gage:		
Floor pan, front	61–81	41–90
Floor pan, intermediate	55	37
Floor pan, rear	62–81	41–80
Oil pan	23–31	10–14
Frame	8–12¾	300–400
Wheel rims	7–9½	.....
Bumpers	8½–13	.....

	Typical Diam. Ordered, in.
Plain carbon hot-rolled bars	
Rear axle	1½
Spark plugs	⅞–1 15/16
Camshafts	1⅞
Connecting rods	1⅞
Motor support arm	1¼
Crankshaft sprocket	2 31/32

Other auto parts for which carbon hot-rolled bars are usually specified include: Miscellaneous formed and forged parts, steering mechanism parts, engine and clutch parts, etc.

Plain carbon cold-finished bars:	
Transmission shafts	1⅛–1 43/64
Transmission gear shift lever	1.0
Differential pinion shaft	0.766
Speedometer gear	2.0
Starter shaft	0.634
Spring shackle pins	0.489–½
Gear shifter shaft	⅝
Piston pins	⅞

Other applications include: Heater parts, brake cylinder parts, front brake flange bolt, miscellaneous clutch parts, oil pump bracket bolt, door handle insert, door handle shaft, rear spring pin, reverse idler shaft, oil pump drive shaft, stud for rear shock absorber, distributor shaft, window regulator pin and cam thrust plunger.

	Typical Diam. Ordered, In.
Hot-rolled alloy bars	
Axle shafts	1 15/16–1¾
Steering knuckles	1¼–2⅞
Steering arms	1¼–1 13/16
Transmission gears	1 7/16–1¾
Ring gears	3–4
Differential gears	1½–2
Springs, coil	0.592–0.750
Springs, leaf	0.231–0.313x1¾
Universal joint	1¾–1⅞
Propeller shafts	1⅞
King pins	1–5 5/64
Rear axle drive pinion	1⅝
Cold-finished alloy bars:	
Transmission shafts	1⅛
Piston pins	⅞
Oil pump drive shaft	½
Differential pinion	2⅛

[1] Weight of 2 parts.
[2] Total weight inner and outer panel.

Materials used in a typical automobile, refrigerator, piano . . . Other steel uses.

4 METAL PRODUCTS

STEEL IN A REFRIGERATOR

Use In Parts, Assembled Units, Pounds

Outer shell:	
Cold-rolled sheet	63.87
Cold-rolled strip	4.16
Liner:	
Enameling sheet	30.10
Compressor:	
Cold-rolled sheet	13.19
Electrical sheet	7.46
Provision compartment door:	
Cold-rolled strip	2.30
Cold-rolled sheet	15.75
Evaporator:	
Stainless sheet	10.03
Machine compartment door:	
Cold-rolled sheet	9.80
Condenser:	
Cold-rolled strip (fins)	7.26
Steel tubing	1.50
Condensing unit base assembly:	
Hot-rolled strip	3.91
Vegetable pan:	
Enameling sheet	1.23
Door trim:	
Stainless strip	1.11
Base trim:	
Stainless steel	0.29
Total	171.66

Source: American Iron & Steel Institute

IRON, STEEL IN A PIANO

Gray Iron Castings, Other Types, Pounds

Gray iron castings	194.00
Blued tuning pins:	
224 tuning pins	8.75
Machine screw stock:	
10 lag screws	1.07
76 action screws	0.98
Wood screws	6.80
Piano wire:	
224 strings	6.13
Cold-rolled bar stock:	
3 nose bolts	1.55
Steel stampings	1.02
Coppered pins:	
448 bridge pins	0.82
Nickel plated pins	0.55
Action springs	0.43
Total	222.10

Source: American Iron & Steel Institute

STEEL USED IN A TYPICAL AUTOMOBILE

Estimates From Various Sources of Sheet and Strip, and Total Steel Content

Source		Sheet and Strip	Total Steel
AMA	Materials used in a typical car	....	3385 lb
AISI	Pounds of steel used in a typical car	....	3544
Confidential	Estimated steel consumption for a typical car	....	2650*
GM Research	Steel in typical car	2556	3320

* This figure is the minimum amount of steel that would be needed. It includes only the steel actually used. When ordering steel for its cars, the industry includes material to replace scrapped parts as well as certain replacement items such as fenders, doors and a small number of body panels. The amount of steel ordered per car included in a model run may reach 3400-3500 lb per car.

WHAT MAKES AN AUTO

Materials in a 1952 4-Door Sedan

	Total (3824 lb car) (lb)	Approximate Requirements per 1000 lb* (lb)
Steel, Net	2556	669
Steel, Gross	3320[1]*	870
Gray Iron, Net	521	136
Gray Iron, Gross	641[2]*	168
Malleable Iron, Net	99.6	26.0
Malleable Iron, Gross	122.5[2]*	32.1
Aluminum and Alloys	11.4[3]	2.98[3]
Copper	26.0	6.8
Copper Alloys	15.6	4.08
Lead and Alloys	30.4	7.95
Zinc and Alloys	66.1	17.3
Antimony	1.1	.29
Manganese	18.8	4.9
Silicon	17.3	4.52
Chromium, Molybdenum and Nickel	7.2[3]	1.88[3]
Tin	1.37	.36
Fabric	92.3	24.2
Glass	76.3	20.0
Rubber Compounds	205.6	53.6
Plastics	5.2[3]	1.36[3]

[1] Based on an estimated 30 pct scrap loss, believed to be a conservative estimate. Scrap losses on bodies as high as 39 pct have been reported.
[2] Based on a 23 pct scrap loss.
[3] These figures vary over a wide range according to the manufacturer's specifications.
* Data not included in McCuen's paper.

Source: C. L. McCuen, General Motors Research Laboratories

STEEL IN PASSENGER CAR

Pounds of Steel by Type

	Lb.
Hot-rolled bars	532
Cold-rolled bars	81
Wire products	187
Pipe and tubes	10
Structural shapes	30
Hot-rolled sheets and strip	1,652
Cold-rolled sheets and strip	984
Plates	45
Terneplate	43
Total	3,544

Source: American Iron & Steel Institute

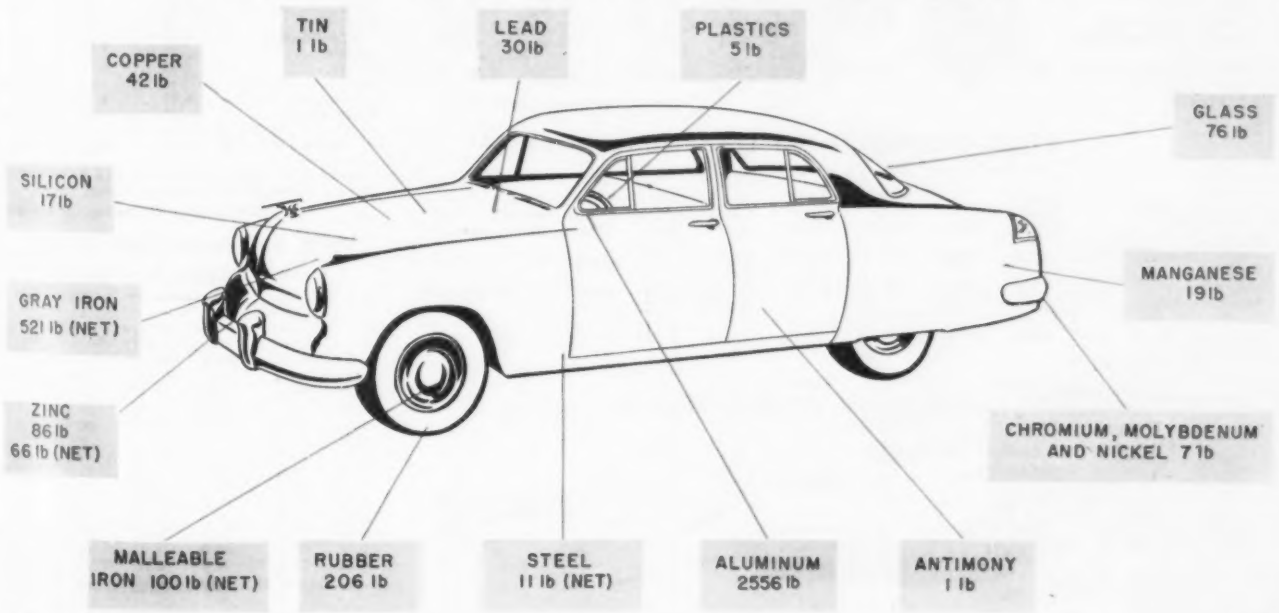
ALLOY STEELS IN AUTO

Typical Materials In Passenger Car

Part	Steels Used
Axle Shafts	T 1330, 8630, 4063, 8640, 8653, 5160, 8160
Steering Knuckles and Arms	1340, 5130, 8640, 4053, 8630, 8150, 5130, 5150
Gears, Transmission	1340, 4032, 8620, 4620, 8125, 6120, TS 8620
Gears, Differential	8620, 4620, 6120
Springs, Coil and Leaf	4068, 9260, 5160, 8165
Bolts	1335, 4037, 4042, 3140, 8640, 8137, 40B37

It is estimated that a typical passenger car uses from 260 to 280 lb of alloy steel.

MATERIALS USED IN TYPICAL 1952 FOUR-DOOR SEDAN



4 METAL PRODUCTS

Motor vehicle production by companies . . . Steel shipped to the auto industry.

MOTOR VEHICLE PRODUCTION BY COMPANIES

U. S. and Canadian Cars and Trucks

PASSENGER CARS	1947	1948	1949	1950	1951	1952*
Chevrolet	695,993	775,969	1,109,958	1,520,577	1,118,096	889,476
Pontiac	223,015	253,469	333,954	467,655	343,795	273,124
Oldsmobile	191,454	194,755	282,885	396,757	285,634	229,331
Buick	267,830	275,504	398,482	522,827	404,695	324,571
Cadillac	59,436	66,209	81,545	110,535	103,266	96,076
Total General Motors	1,437,728	1,565,926	2,206,824	3,048,351	2,255,486	1,812,578
Plymouth	350,327	377,797	575,071	573,166	620,870	471,320
Dodge	231,804	239,164	298,399	332,782	325,694	254,444
De Soto	81,552	92,920	108,440	127,557	121,794	98,362
Chrysler	108,103	119,061	141,825	168,278	164,936	124,116
Total Chrysler	771,786	828,942	1,123,735	1,201,783	1,233,294	948,242
Ford	601,665	549,077	841,170	1,187,120	900,770	780,205
Mercury	124,612	154,702	203,339	334,081	238,854	189,005
Lincoln	29,275	43,688	33,132	35,485	25,386	36,342
Total Ford	755,552	747,467	1,077,641	1,556,686	1,165,010	1,005,552
Total Big Three	2,965,066	3,142,335	4,408,200	5,806,820	4,653,790	3,766,372
Crosley	19,588	27,982	8,942	7,612	4,839	1,491
Hudson	100,862	143,697	142,462	143,006	93,327	85,319
Kaiser-Frazer	144,507	181,316	57,995	146,911	99,343	73,416
Nash	113,315	118,621	142,592	189,543	161,209	156,112
Packard	55,477	96,898	104,593	72,098	76,075	62,000
Studebaker	123,641	166,755	228,402	268,099	222,000	159,000
Willys	33,336	32,701	32,874	38,052	28,226	60,000
Total Independents	590,726	769,880	717,860	865,321	685,019	587,338
Total Passenger Cars	3,555,792	3,912,215	5,126,060	6,672,141	5,338,809	4,363,710
MOTOR TRUCKS						
Chevrolet	335,348	389,690	383,534	494,573	426,115	332,645
GM Truck	61,918	92,677	83,840	110,528	127,447	119,268
Pontiac	.....	.....	2,490	.....	1,822	2,526
Total General Motors	397,264	482,367	469,873	605,101	555,384	454,439
Dodge	165,905	172,020	151,513	125,773	169,000	170,053
Ford	247,832	301,791	244,613	345,800	317,252	237,515
Total Big Three	811,001	956,178	865,999	1,076,674	1,041,636	862,007
Crosley	3,055	2,673	375	.....	759	197
Diamond T	16,205	12,684	5,545	6,841	7,529	7,902
Federal	10,114	3,898	1,649	1,907	2,624	1,704
Hudson	2,918	.....	.....	.....	.....	.....
International	153,009	166,784	110,572	106,418	151,439	126,589
Mack	17,072	11,570	9,025	12,051	14,220	10,344
Nash	129	1,051	676	.....	992	831
Ree	20,349	11,452	3,600	9,290	14,858	17,492
Studebaker	67,810	67,983	63,473	50,323	51,814	59,656
White	18,479	12,507	8,707	14,638	16,774	12,154
Willys	86,397	104,989	49,973	48,906	96,815	100,207
Miscellaneous	30,162	17,703	12,544	.....	.....	10,461
Total Independents	425,699	413,294	266,139	267,551	357,824	347,537
Total Trucks	1,236,700	1,369,492	1,132,138	1,344,225	1,399,460	1,209,544
Total Cars and Trucks	4,792,492	5,281,707	6,258,198	8,016,366	6,738,269	5,573,254
Canadian Cars and Trucks	.....	.....	290,981	390,836	410,000	434,083
Total Vehicles, U. S. & Canada	.....	5,281,707	6,549,179	8,407,202	7,148,269	6,007,337

* Estimated.

Source: Ward's Automotive Reports

STEEL SHIPPED TO AUTO INDUSTRY

Net Ton Deliveries* for Cars, Trucks and Parts Makers

	Ingots, Blooms, Slabs, etc.	Plates	Hot-Rolled Sheets	Cold-Rolled Sheets	Hot-Rolled Bars	Cold-Finished Bars	Cold-Rolled Strip	Hot-Rolled Strip	Total Steel Products
Passenger cars, trucks and other commercial vehicles	121,098	130,866	589,384	1,864,838	663,330	113,665	156,077	169,686	3,982,565
Parts, accessories and supplies	28,644	187,661	698,441	622,100	532,732	141,176	179,524	232,183	2,887,456
Automotive forgings	66,269	1,700	.....	.....	207,574	5,023	.....	.....	280,802
Totals	216,011	320,227	1,287,825	2,486,938	1,403,636	259,864	335,601	401,869	7,150,843

* Nine months 1952.

Source: American Iron and Steel Institute

AUTOMOBILE INDUSTRY WAGES

Employment and Average Earnings

	All Employees	Production and Related Workers			
	Number (thousands)	Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	792.8	657.6	$61.86	38.4	$1.611
1949	769.0	643.5	65.97	38.9	1.696
1950	839.4	713.5	73.25	41.2	1.778
1951	856.3	718.4	75.52	39.5	1.912
1952:					
Jan.	775.3	635.0	80.55	40.5	1.989
Feb.	765.9	625.7	79.83	40.4	1.976
Mar.	786.6	642.6	80.84	40.4	2.001
Apr.	808.7	664.8	79.68	39.9	1.992
May	812.9	667.4	80.24	40.1	2.001
June	818.0	671.1	79.43	39.5	2.011
July	668.4	520.7	71.33	35.9	1.987
Aug.	679.2	532.5	76.87	38.0	2.023

Source: Bureau of Labor Statistics

LOCOMOTIVES ORDERED IN U. S.

Steam, Diesel and Electric

	Steam	Diesel-Electric	Electric	Diesel-Hydraulic	Gas-turbine Electric	Total
1932	5	7	0	.....	.....	12
1935	30	60	7	.....	.....	97
1936	435	77	24	.....	.....	536
1937	173	145	36	.....	.....	354
1938	36	160	29	.....	.....	225
1939	119	249	32	.....	.....	400
1940	207	492	13	.....	.....	712
1941	302	1,104	38	.....	.....	1,444
1942	363	894	12	.....	.....	1,269
1943	413	635	0	.....	.....	1,048
1944	74	680	3	.....	.....	757
1945	148	691	6	.....	.....	845
1946	55	989	8	.....	.....	1,052
1947	79	2,149	1	.....	.....	2,229
1948	54	2,661*	2	.....	.....	2,717
1949	13	1,785	10	.....	.....	1,803
1950	15	4,381	8	12	10	4,381
1951	21	3,526	.....	.....	.....	3,547
1952†	15	1,460	.....	.....	15	1,490

* 1948 Diesel orders shown as units Previous orders shown as locomotives which may include one or more units
† 10 mos Source: Association of American Railroads

R. R. PASSENGER CARS

Steel Use In Tons Per Car

	Coach	Sleeper Roomette and Bedrooms	Baggage-Express
Billets	1.72	1.82	1.82
Shapes	4.84	4.84	4.77
Plates	5.79	5.79	6.11
Bars	2.84	2.84	2.88
Pipe—steel	.14	.19	.14
Sheets and strip	11.78	12.17	11.72
Wheels	3.80	3.80	3.80
Axles	1.70	2.05	2.06
Steel castings—body	.53	.53	.53
Steel castings—truck	4.89	5.17	5.17
Miscellaneous	.32	.32	.32
Totals	38.35	39.82	38.31

Note: Above covers cars with all-steel frame construction and aluminum and steel interior finish.

Source: American Railway Car Institute

R. R. EQUIPMENT EMPLOYMENT

Average Earnings by Week, Hour

	All Employees	Production and Related Workers			
	Number (thousands)	Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	84.8	69.6	$62.24	40.0	$1.556
1949	76.1	61.0	63.54	39.2	1.621
1950	62.2	47.9	66.33	39.6	1.675
1951	72.4	56.7	75.99	40.9	1.858
1952:					
Jan.	75.9	61.3	76.79	41.0	1.873
Feb.	74.5	60.1	78.12	41.4	1.887
Mar.	76.0	60.7	78.55	41.3	1.902
Apr.	72.2	56.5	76.25	40.3	1.892
May	75.5	60.4	76.11	40.4	1.884
June	76.3	61.2	77.26	40.3	1.917
July	65.2	50.0	74.83	40.1	1.866
Aug.	71.5	56.0	76.06	39.8	1.911

Source: Bureau of Labor Statistics

Steel requirements for railroad freight cars . . . Steel use in 50-ton box cars. Bookings of fabricated structural steel.

4 METAL PRODUCTS

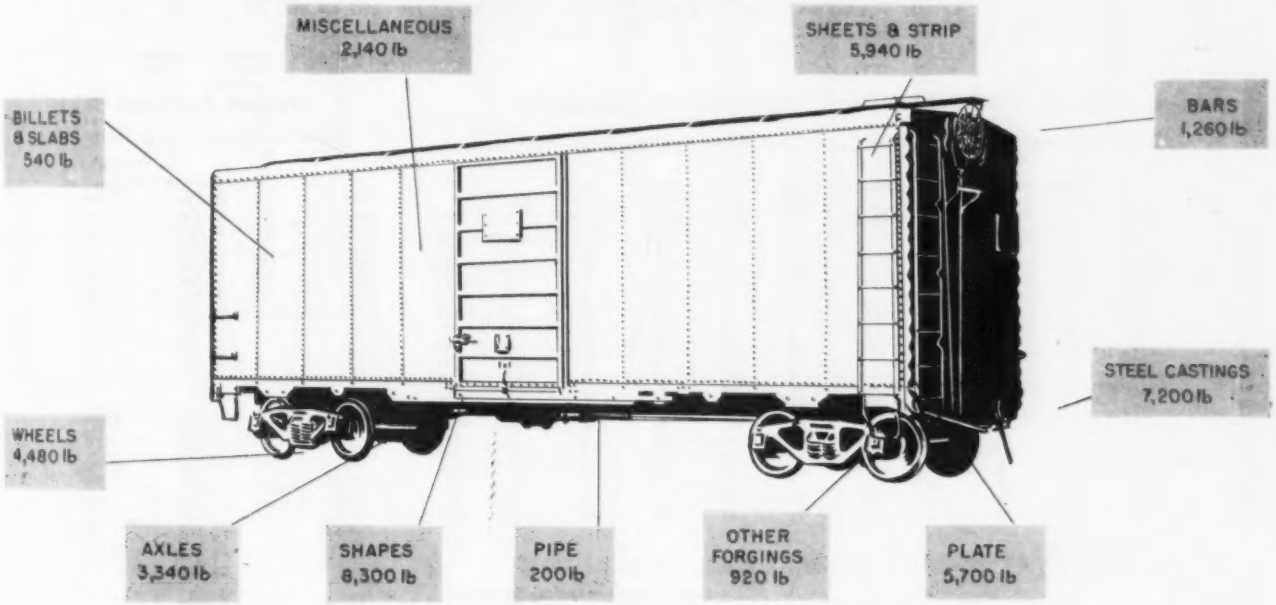
FABRICATED STRUCTURAL STEEL

Estimated Bookings, Net Tons

Month	1938	1939	1940	1941	1942	1943†	1944†	1945†	1946	1947‡	1948	1949	1950	1951	1952
Jan.	80,320	101,712	81,689	281,235	183,387	50,172	45,109	51,678	235,817	138,985	201,267	160,377	147,275	361,373	213,110
Feb.	57,144	82,719	98,882	173,559	228,688	34,657	37,477	62,856	132,707	164,959	162,181	134,910	146,695	256,746	230,832
March	84,257	95,065	128,321	206,072	248,319	32,009	27,836	79,730	173,871	195,020	267,919	186,498	236,111	297,517	226,394
April	91,158	118,309	73,790	216,018	313,953	50,726	61,498	97,186	128,671	204,901	192,393	122,825	191,183	337,026	209,106
May	77,322	156,848	126,815	179,884	161,039	32,020	34,840	52,982	165,290	145,237	175,646	146,705	237,476	268,166	209,888
June	99,899	111,594	109,744	246,910	184,516	79,409	56,239	104,283	131,010	132,667	198,906	122,325	333,000	207,966	167,492
July	96,013	114,056	194,940	214,756	125,243	56,712	90,043	77,760	137,241	198,581	218,540	157,264	341,952	222,540	221,559
Aug.	106,772	100,849	122,468	188,658	80,805	37,563	44,740	97,682	165,590	189,802	212,139	123,068	326,586	212,730	252,849
Sept.	92,469	121,357	225,494	156,782	68,520	61,659	51,133	139,420	114,295	176,353	220,191	149,710	317,225	188,187	207,695
Oct.	154,756	118,841	240,942	128,658	50,946	59,282	80,521	124,707	142,585	200,113	201,055	196,563	295,391	183,921	184,711
Nov.	153,084	99,316	141,945	184,043	49,637	34,093	62,437	117,755	102,399	167,440	173,415	128,473	308,193	192,065	175,000*
Dec.	163,445	84,383	203,124	146,379	67,600	35,282	37,004	108,048	96,601	181,651	209,240	156,263	284,492	202,835	175,000*
Total	1,256,639	1,305,049	1,748,144	2,296,954	1,762,453	863,584	628,877	1,114,087	1,726,057	2,096,709	2,432,892	1,784,981	3,165,579	2,931,072	2,472,636*
No. av.	104,720	108,754	145,679	191,413	146,871	46,965	52,406	92,841	143,838	174,726	202,741	148,748	263,798	244,256	206,136*
Approximate yearly total for industry							707,460	786,096	1,392,608						

Years 1910-1932 incl. Dept. of Commerce records; years 1933-1949 incl. A. I. S. C. records.
† The tonnages shown for 1936 to 1942 inclusive, 1946, 1947, 1948 and 1949 are estimated for the entire industry; for the years 1943, 1944 and 1945, they are on basis of tonnage actually reported to the Institute. It is estimated that these reporting companies in 1943, 1944 and 1945 represented 80 pct of the total industry for the base years of 1923-1925.
* Estimated. ‡ Tonnages for 1947 and later years are shown on revised base. Base=1947 U. S. Census of Manufactures, adjusted to eliminate items not reportable to the Institute.
Source: American Institute of Steel Construction

STEEL USED IN THE AVERAGE 50-TON BOX CAR



STEEL REQUIREMENTS FOR RAILROAD FREIGHT CARS

Steel Products Used in Principal Types of Cars, Net Tons

Item	Box 40'6" 50-T	Box 50'6" 50-T	Gondola H. S. 50-T Wd. Fl.	Gondola H. S. 70-T Stl. Fl. D. E.	Hopper 50-T	Hopper 70-T	Cov. Hopper 70-T 1958 Cu Ft	Ore 70-T	Flat 50-T	Flat 70-T	Refr. 40-T	Refr. 70-T	Stock 40-T	Air Dump 30 Cu Yd 50-T	Tank 10M-Gal ICC-103W 50-T	Tank 10650-G. ICC-105A 500W 70-T
Billets and Slabs	0.27	0.28	0.36	0.12	.....	.....	0.31	0.06	0.27	0.32	0.30	0.30	0.27	0.30	.....	.....
Shapes	4.15	5.14	3.52	4.75	4.50	4.81	4.96	2.67	5.27	8.33	4.15	5.13	4.15	6.44	2.53	3.37
Plates	2.85	2.92	8.71	14.97	7.47	10.00	6.06	6.66	7.39	9.48	2.85	3.66	2.85	10.86	10.52	28.55
Bars	0.63	1.33	0.58	1.12	0.62	0.73	0.94	1.11	0.87	1.56	0.63	2.08	0.63	1.85	0.19	0.39
Pipe	0.10	0.12	0.10	0.11	0.08	0.10	0.10	0.09	0.11	0.11	0.10	0.12	0.10	0.43	0.26	0.26
Sheet and Strip	2.97	4.99	0.08	.....	0.20	0.29	3.05	0.03	0.12	.....	4.60	7.41	0.50	0.58	0.10	0.10
Other Forgings	0.46	0.46	0.66	.....	0.40	0.50	0.87	0.13	0.41	0.41	0.46	0.66	0.46	0.26	0.58	0.65
Miscellaneous	1.07	1.07	1.05	0.92	0.98	1.00	1.19	2.33	1.12	1.13	1.07	1.30	1.07	0.62	1.70	3.34
Axles	1.67	1.67	1.67	2.03	1.67	2.03	2.03	2.03	1.67	2.03	1.41	2.03	1.41	1.67	1.67	2.03
Wheels—Steel*	2.24	2.24	2.24	2.44	2.24	2.44	2.44	2.44	2.24	2.44	2.24	2.44	2.24	2.24	2.24	2.44
Steel Castings	3.60	3.60	4.25	4.31	3.60	4.18	4.52	3.60	3.60	4.11	3.60	4.75	3.60	4.67	3.08	3.78
Totals	20.01	23.82	23.22	30.77	21.74	26.08	26.47	21.15	23.07	29.92	21.41	29.88	17.28	29.92	22.87	44.93

* If Chilled Iron Wheels used, this amount eliminated.

Source: American Railway Car Institute

4 METAL PRODUCTS

Merchant ship construction . . . Railroad freight and passenger car statistics . . . Manufacture of farm machinery in the U.S.

MERCHANT SHIPBUILDING IN PRINCIPAL COUNTRIES OF THE WORLD

New Construction in Hand or on Order, on Oct. 1, 1952, 1000 Gross Tons and Over

Country	Cargo		Tankers		Passenger and Comb. Pass. Cargo		Total			Oct. 1, 1951		
	No. of Vessels	Gross Tons	No. of Vessels	Gross Tons	No. of Vessels	Gross Tons	No. of Vessels	Gross Tons	Pct of Total	No. of Vessels	Gross Tons	Pct of Total
Great Britain	383	2,283,753	276	3,543,863	42	421,280	701	6,248,896	39.5	623	5,502,379	42.5
Germany	164	778,982	79	1,025,526	5	36,500	248	1,841,008	11.6	210	1,251,668	9.6
Sweden	79	372,285	104	1,317,820	2	5,150	185	1,695,255	10.7	170	1,496,173	11.5
UNITED STATES	44	441,800	51	859,480	1	13,500	96	1,314,780	8.3	85	1,082,990	8.5
Holland	56	217,704	66	789,537	12	78,700	134	1,085,941	6.9	105	928,765	7.2
France	47	218,949	31	498,217	14	135,050	92	852,216	5.4	68	487,462	3.8
Japan	33	218,010	28	440,700	1	8,400	62	667,110	4.2	73	577,325	4.5
Norway	35	131,480	44	494,846	5	18,934	84	645,260	4.1	79	490,663	3.9
Italy (ex-Trieste)	6	19,520	20	298,738	11	87,300	37	405,558	2.6	40	307,250	2.3
Denmark	33	156,650	16	170,800	9	57,400	58	384,850	2.4	54	315,739	2.4
Belgium	10	50,499	13	171,998	3	26,384	26	248,881	1.6	23	158,281	1.2
Spain	16	31,104	6	47,116	11	89,300	33	167,520	1.0	30	102,834	.8
Canada	6	64,200	3	48,800	.....	.....	9	113,000	.7	18	114,150	.9
Australia	16	75,028	.....	.....	.....	.....	16	75,028	.5	10	34,170	.3
Trieste	3	5,400	3	32,900	2	22,800	8	61,100	.4	4	67,000	.5
Eire	2	2,300	.....	.....	.....	.....	2	2,300	.1	1	1,300	.1
TOTAL	933	5,067,664	740	9,740,341	118	1,000,698	1,791	15,808,703	100.0	1,593	12,918,149	100.0

Source: Shipbuilders Council of America

DOMESTIC RAILROAD PASSENGER CARS ORDERED

Coach, Dining and Combination Type Cars Shown In Data From 1929

	Coach	Coach and Comb.	Baggage and Express	Express Refr. and Milk	Sleeping and Comb.	Parlor, Club, etc.	Dining	Postal and Comb.	Self Propelled	All Other	Total
1932	2	1	4	2	1	0	0	4	0	30	44
1935	14	16	7	55	18	6	10	7	0	0	133
1936	294	36	35	0	5	26	44	10	0	1	451
1937	136	23	58	110	171	18	37	8	0	6	567
1938	85	28	42	0	86	10	15	10	0	2	278
1939	97	20	9	0	125	18	38	12	0	2	321
1940	220	26	8	0	53	6	48	13	0	5	379
1941	184	13	69	0	197	16	36	46	0	8	549
1942	0	1	2	0	0	0	0	0	0	31	34
1943	14	2	3	0	0	0	4	12	0	1650	1685
1944	481	36	20	0	26	16	53	12	0	101	725
1945	296	17	134	25	570	84	98	54	0	1767	2993
1946	311	40	22	0	587	53	143	45	0	36	1238
1947	132	0	22	0	72	36	19	29	0	6	316
1948	143	0	51	0	156	20	25	10	0	101	506
1949	46	0	6	0	30	6	14	6	0	1	109
1950	21	0	38	0	1	0	0	10	0	32	102
1951	50	14	10	0	66	26	19	3	7	67†	261
1952*	107	0	75	0	131	27	24	10	58	209‡	641

* January through November.
† Includes 67 units for the Armed Forces.
‡ Includes 120 inter-urban and multi units.

Source: American Railway Car Institute

FREIGHT CARS DELIVERED

Data for Builders and Private Shops

Year	Car Builders' Shops	Railroad and Private Line Shops	Total
1941	63,396	17,227	80 623
1942	47,429	15,444	62,873
1943	24,616	7,220	31,836
1944	27,953	15,050	43,003
1945	31,011	12,853	43,864
1946	31,885	10,070	41,955
1947	52,990	15,532	68,522
1948	83,196	29,444	112,640
1949	62,955	29,607	92,562
1950	24 443	19,548	43,991
1951	67,744	28,299	96,043
1952:			
Jan.	6,082	2,561	8,643
Feb.	5,494	1,889	7,383
Mar.	5,838	2,321	8,159
Apr.	5,204	2,199	7,403
May	4,765	2,092	6,857
June	4,848	1,563	6,411
July	3,860	1,542	5,402
Aug.	2,853	1,684	4,537
Sept.	1,879	1,883	3,762
Oct.	2,963	2,474	5,437
Nov.	4,032	1,897	5,929
Total	47,818	22,105	69,923

Source: American Railway Car Institute

SELECTED FARM MACHINERY

Manufactured in the U. S. in Number of Units

	Tractor Mold Board Plows	Corn Binders	Corn (Field) Pickers	Silage Cutters	Grain Binders	Grain Threshers	Combines, Harv. and Thresh.	Manure Spreaders	Tractor Cultivators	One Way Disc Plows or Tillers	Hay Loaders	Pickup Hay Balers	Milking Machines	Power Sprayer and Dusters	Field Cultivators	Sweep Rakes
1931	26,827	No data	3,243	3,156	15,356	3,954	5,907	19,707	15,631	7,085	10,042	1,311	14,896	5,955	No data	7,118
1935	57,862	19,290	1,845	7,294	47,680	4,619	3,872	31,462	54,519	6,980	8,813	No data	4,217	8,180	4,810	5,244
1936	116,213	19,364	4,052	12,850	66,970	8,622	16,983	53,361	115,957	9,651	22,742	No data	9,841	9,655	5,758	8,508
1937	149,006	16,694	13,586	10,197	32,295	4,996	29,403	60,057	127,188	15,027	27,256	No data	21,502	9,680	11,774	7,094
1938	117,960	12,765	16,722	11,743	47,619	8,649	48,046	27,344	90,760	13,245	17,481	No data	18,787	7,920	11,488	7,508
1939	98,672	5,535	16,044	9,125	15,242	2,781	41,537	33,363	65,547	9,408	15,350	454	22,798	9,904	6,004	4,783
1940	171,896	9,990	11,638	8,507	No data	2,054	46,552	46,078	104,345	14,148	20,226	1,464	44,374	6,845	8,138	6,497
1941	183,497	13,175	15,958	11,403	No data	2,459	54,296	69,618	175,285	17,074	29,930	8,200	55,711	9,915	13,115	9,397
1942	132,131	No data	13,640	8,332	5,171	2,146	41,722	56,881	141,704	11,274	19,426	8,801	37,287	10,363	11,313	9,812
1943	55,182	3,077	12,592	4,163	3,782	868	29,219	17,448	84,802	5,363	11,508	5,418	46,892	7,475	3,718	6,549
1944	121,689	9,709	25,371	8,757	11,317	1,858	44,704	49,522	181,554	12,945	21,065	12,126	78,421	13,875	17,618	14,590
1945	158,159	8,899	35,885	9,006	9,054	1,185	51,418	44,997	191,330	13,122	20,591	12,535	125,413	16,928	21,214	17,699
1946	162,113	7,218	34,554	9,294	No data	2,563	48,811	44,143	181,489	16,731	25,273	11,072	146,203	26,598	22,323	40,046
1947	244,116	No data	66,055	13,222	9,523	1,277	76,638	64,927	245,735	25,670	20,407	26,573	176,195	57,454	39,564	21,388
1948	308,805	No data	78,806	10,709	No data	2,161	90,668	118,206	359,057	35,429	28,472	48,469	128,599	119,952	74,892	14,901
1949	329,463	No data	90,410	7,752	No data	2,168	104,888	128,497	327,244	30,575	13,109	57,262	108,540	74,597	62,569	5,176
1950	341,710	No data	88,836	2,997	No data	779	116,274	98,551	247,530	24,151	6,429	60,642	102,949	107,455	36,087	3,098
1951	335,658	No data	93,538	1,456	No data	731	109,019	104,604	288,338	26,973	4,216	66,715	94,174	136,075	43,629	1,706

Source: U. S. Department of Commerce

Federal Reserve index of industrial production . . . Trailer and chassis production. Railroad and aircraft employment, earnings.

4 METAL PRODUCTS

SHIPBUILDING EMPLOYMENT

Workers' Average Earnings

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$60.68	38.7	$1.568	123.2	140.7
1949	61.67	37.0	1.623	85.0	100.3
1950	63.28	38.4	1.648	71.4	84.4
1951	70.56	40.0	1.764	98.9	113.7
1952:					
Jan.	74.85	40.7	1.839	116.4	132.4
Feb.	74.32	40.0	1.858	124.0	141.7
Mar.	76.81	40.9	1.878	125.8	142.5
Apr.	75.01	40.5	1.852	127.9	144.5
May	76.36	41.1	1.858	132.9	150.1
June	75.99	40.9	1.858	134.7	152.1
July	74.76	40.5	1.846	134.6	151.9
Aug.	76.02	40.5	1.877	133.1	151.3

Source: Bureau of Labor Statistics

R. R. EARNINGS, EMPLOYMENT

Class I Railroads Only

	Non-Supervisory Employees			All Employees Number (thousands)
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	
1948	$59.14	46.1	$1.284	1,327
1949	61.73	43.5	1.419	1,191
1950	63.20	40.8	1.549	1,220
1951	69.78	41.0	1.702	1,276
1952:				
Jan.	74.09	41.6	1.781	1,222
Feb.	76.69	42.7	1.796	1,216
Mar.	71.52	40.2	1.779	1,221
Apr.	72.65	41.3	1.759	1,230
May	70.57	39.8	1.773	1,243
June	70.78	39.5	1.792	1,224
July	71.86	39.7	1.810	1,183
Aug.	72.98	40.0	1.824	1,219

Source: Bureau of Labor Statistics

AIRCRAFT AND PARTS WAGES

Employment and Average Earnings

	All Employees	Production and Related Workers			
	Number (thousands)	Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	228.1	166.6	$61.21	41.0	$1.493
1949	255.6	188.5	63.62	40.6	1.567
1950	275.4	201.8	68.39	41.6	1.644
1951	456.3	336.6	78.05	43.8	1.782
1952:					
Jan.	567.2	415.4	79.53	43.2	1.844
Feb.	580.8	423.9	80.01	43.2	1.852
Mar.	586.1	427.7	80.57	42.9	1.878
Apr.	590.3	428.7	78.08	42.0	1.859
May	598.2	437.2	79.68	42.6	1.870
June	610.8	445.6	80.36	42.7	1.882
July	625.0	454.2	80.66	42.7	1.889
Aug.	638.1	465.1	80.64	42.4	1.902

Source: Bureau of Labor Statistics

FEDERAL RESERVE INDEX OF INDUSTRIAL PRODUCTION

Durable and Nondurable Manufactures, Fuels, Metals (Monthly Data Adjusted for Seasonal Variation)

	Combined Index	Manufacturers			Minerals		
		Total	Durable Manufactures Total	Nondurable Manufactures Total	Total	Fuels	Metals
1935 monthly av.	87	87	83	90	86	89	73
1936 monthly av.	103	104	108	100	99	99	102
1937 monthly av.	113	113	122	106	112	109	127
1938 monthly av.	89	87	78	95	97	99	86
1939 monthly av.	109	109	109	109	106	105	113
1940 monthly av.	125	126	139	115	117	114	134
1941 monthly av.	162	168	201	142	125	122	149
1942 monthly av.	199	212	279	158	129	125	148
1943 monthly av.	239	258	360	176	132	132	128
1944 monthly av.	235	252	353	171	140	145	113
1945 monthly av.	203	214	274	166	137	143	101
1946 monthly av.	170	177	192	165	134	142	88
1947 monthly av.	187	194	220	172	149	155	118
1948 monthly av.	192	198	225	177	155	161	120
1949 monthly av.	176	183	202	168	135	139	107
1950 monthly av.	200	209	237	187	148	152	125
1951: Jan.	221	231	268	201	164	169	130
Feb.	221	232	271	201	158	163	131
Mar.	222	234	277	199	158	163	127
Apr.	223	234	279	198	164	167	140
May	222	233	276	198	165	168	151
June	221	231	274	197	165	169	145
July	212	222	265	187	156	160	132
Aug.	217	226	267	193	165	171	134
Sept.	218	228	271	192	167	172	137
Oct.	218	226	274	188	174	179	144
Nov.	219	228	277	188	170	178	122
Dec.	218	228	282	185	163	170	122
1951 monthly av.	219	229	273	194	164	169	135
1952: Jan.	221	231	282	189	167	175	125
Feb.	222	232	284	190	167	174	128
Mar.	221	231	285	188	164	170	125
Apr.	216	225	277	183	166	171	141
May	211	224	277	181	140	140	143
June	204	214	248	188	147	161	65
July	193	202	231	179	142	155	66
Aug.	214	224	266	191	157	161	132
Sept.	225	235	285	194	174	178	152
1952 monthly av.*	214	224	271	187	158	165	120

* Nine month preliminary average.

Source: Federal Reserve Board

U. S. TRAILER AND TRAILER CHASSIS PRODUCTION

Production of Principal Types of Trucking Equipment

	1946	1947	1948	1949	1950	1951	1952 (9 Mos.)
Total (Including Trailer Chassis)	76,234	53,096	44,478	33,097	64,301	67,384	42,476
Complete Trailers	70,619	49,795	42,395	31,571	61,957	64,119	39,179
Vans	34,651	23,254	23,199	18,317	38,016	32,571	18,310
Insulated and 'Reefers'	3,384	1,852	2,279	2,642	3,795	4,178	2,464
Furniture	2,648	1,185	548	†	†	1,365	1,803
Other Closed Top	28,590	18,601	18,372	14,056	30,295	23,673	11,178
Open Top	2,029	1,616	2,002	1,619	3,926	3,355	1,585
Platforms	19,945	12,555	7,514	6,159	11,418	13,417	10,099
Cattle and Stake Racks	8,183	3,369	1,588	950	1,590	1,943	3,413
Grain Bodies	.....	1,271	586	359	642	855	970
All Other Platform	11,762	7,915	5,340	4,850	9,186	10,619	5,716
Tanks	2,626	3,430	3,550	2,035	3,982	5,961	3,906
Petroleum	2,231	3,019	3,176	1,855	3,710	5,319	3,282
Other	395	411	374	180	272	642	624
Pole and Logging	7,568	5,356	3,671	1,260	2,512	3,004	1,844
Single Axle	5,970	3,815	2,064	642	1,434	1,231	669
Tandem Axle	1,598	1,541	1,607	618	1,078	1,773	1,175
Low Bed Heavy Haulers	1,976	2,403	1,821	1,426	1,758	4,188	4,499
Off-Highway*	619	808	.....	.....	.....	.....	.....
Dump Trailers	697	622	504	470	903	1,321	840
All Other Trailers	2,537	1,365	2,136	1,904	3,371	3,657	1,681
Trailer Chassis	5,615	3,301	2,083	1,526	2,344	3,265	2,627
Total Dollar Value of Shipments	$151,384,063	$138,383,093	$139,998,000	$119,098,000	$228,504,000	.....	.....

† Combined with Other Closed Tops.

* Combined with All Other Trailers since August, 1948.

Source: Truck-Trailer Mfrs. Assn.

4 METAL PRODUCTS

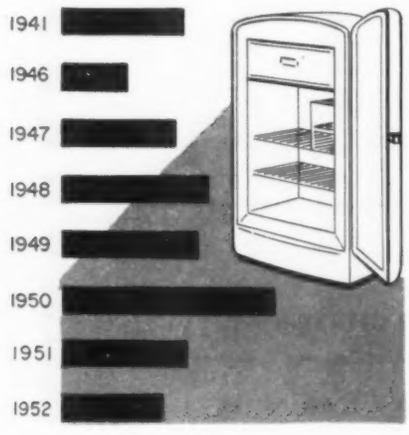
U S. Freight car loadings by products Household appliances: Sales and retail value . . . Refrigerator index of sales

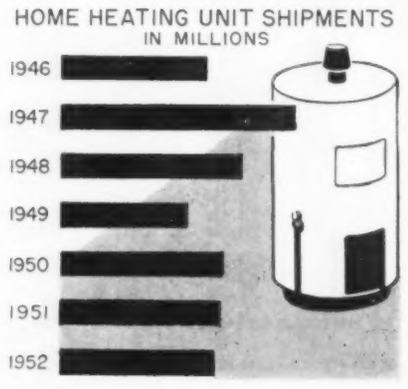
DISPOSITION OF INCOME

Totals By Billions of Dollars

	Total	Personal Tax and Nontax Payments	Disposable Personal Income	
			Total	Personal Saving
1936	68.4	2.3	66.1	3.6
1937	74.0	2.9	71.1	3.9
1938	68.3	2.9	65.5	1.0
1939	72.6	2.4	70.2	2.7
1940	78.3	2.6	75.7	3.7
1941	95.3	3.3	92.0	9.8
1942	122.7	6.0	116.7	25.6
1943	150.3	17.8	132.4	30.2
1944	165.9	18.9	147.0	35.4
1945	171.9	20.9	151.1	28.0
1946	177.7	18.8	158.9	12.0
1947	191.0	21.5	169.5	3.9
1948	209.5	21.1	188.4	10.5
1949	205.1	18.6	186.4	6.3
1950	224.7	20.5	204.3	10.7
1951	253.0	28.7	224.3	17.6
1950				
First quarter	216.3	19.0	197.3	12.5
Second quarter	217.1	19.5	197.5	8.9
Third quarter	227.3	20.2	207.1	4.6
Fourth quarter	238.3	23.1	215.2	16.8
1951				
First quarter	244.1	27.4	216.8	8.5
Second quarter	249.9	28.0	221.8	20.1
Third quarter	256.1	29.0	227.1	20.7
Fourth quarter	262.0	30.4	231.5	21.1
1952				
First quarter	263.0	32.5	230.5	17.3
Second quarter	264.4	32.9	231.5	16.5
Third quarter	.....	.....	.....	.....

Source: U. S. Dept. of Commerce





CARS OF REVENUE FREIGHT LOADED, BY PRODUCTS

Grain, Ore, Live Stock, Coal, Coke, Forest Products Shown

Period	Total Revenue Freight Loaded	Grain and Grain Products	Live Stock	Coal	Coke	Forest Products	Ore	Merchandise L.C.L.	Miscellaneous
1943	42,439,951	2,648,308	837,777	8,507,036	751,687	2,228,907	2,815,572	5,079,720	19,570,944
1944	43,408,295	2,520,733	892,145	8,889,518	750,685	2,271,450	2,648,589	5,427,928	20,007,247
1945	41,918,120	2,733,968	893,525	8,296,208	694,707	2,038,992	2,474,336	5,528,509	19,257,875
1946	41,341,278	2,497,043	924,919	8,004,021	586,890	2,263,246	1,995,721	6,325,295	18,744,143
1947	44,502,188	2,725,655	770,123	9,088,131	732,130	2,414,548	2,651,024	6,071,293	20,049,284
1948	42,833,902	2,467,286	630,873	8,729,745	735,801	2,359,193	2,780,635	5,457,824	19,672,545
1949	35,909,741	2,583,900	551,124	5,217,387	588,181	1,952,294	2,210,337	4,588,485	17,216,033
1950	38,902,641	2,465,596	491,116	7,241,163	727,236	2,222,431	2,529,177	4,268,367	18,954,437
1951	40,497,386	2,587,862	497,178	7,502,693	837,163	2,363,577	3,004,141	3,886,031	19,838,741
1951: First quarter	9,494,206	643,396	96,607	1,866,910	206,966	579,838	233,501	1,017,026	4,850,062
Second quarter	10,423,198	592,514	100,934	1,792,889	209,523	631,444	998,628	998,406	5,098,860
Third quarter	10,424,844	682,738	129,931	1,788,244	208,709	589,931	1,139,455	931,055	4,954,781
Fourth quarter	10,155,138	669,214	169,706	2,054,650	211,965	562,464	632,557	919,544	4,935,038
1952: First quarter	9,338,067	625,009	104,868	1,900,446	209,492	555,570	251,805	934,813	4,756,064
Second quarter	9,198,050	597,952	103,413	1,583,905	142,096	555,713	709,780	924,225	4,580,966
Third quarter	9,369,765	592,416	115,263	1,566,386	129,506	592,134	878,323	909,980	4,585,757
Fourth quarter*	7,294,719	585,072	132,552	1,151,746	132,450	403,036	728,266	661,207	3,611,757

* Through November 29.

Source: Association of American Railroads

ELECTRIC HOUSEHOLD REFRIGERATOR INDEX OF SALES

Index of Domestic Refrigerator Sales Billed; Average Month 1936 = 100

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1935	56.2	70.8	124.5	155.7	142.8	93.5	89.8	64.1	31.2	25.3	27.3	44.0	77.1
1936	69.4	105.8	156.7	175.0	189.4	136.8	118.0	61.6	46.1	25.5	45.0	70.9	100.0
1937	100.8	144.5	207.4	197.2	196.1	157.6	113.5	70.9	48.7	39.9	52.8	64.5	116.2
1938	61.0	84.3	101.3	123.7	104.4	61.0	51.7	54.1	36.2	20.0	18.7	27.8	62.0
1939	87.9	117.4	142.8	147.7	155.5	152.6	93.2	53.8	41.5	35.2	31.4	52.6	92.6
1940	133.5	159.7	169.7	208.7	236.9	202.0	152.7	126.9	69.2	54.3	49.1	71.0	138.1
1941	231.7	220.8	260.5	297.3	267.3	233.1	211.4	168.5	102.4	82.8	57.3	62.6	183.0
Insufficient data available for computing indexes or the years 1942-1945 inclusive.													
1946		Average first 6 months—71.2					118.1	121.6	128.1	146.7	134.3	136.0	101.0
1947	131.7	113.4	154.3	167.6	176.4	183.0	173.3	133.1	179.7	197.1	181.9	211.2	166.9
1948	161.8	188.2	226.0	219.0	210.5	246.5	231.9	185.8	225.7	249.7	245.4	216.7	218.9
1949	253.1*	224.2	245.3	215.6	220.0	197.1*	209.9	204.6	205.9	168.0	137.4*	160.9	203.5
1950	226.1	279.7	355.6	330.0	328.0	331.5	304.3	293.0	302.1	235.6	227.9	218.5	286.1
1951	274.8	237.7	329.5	241.8	182.8	154.3	117.9	97.6	114.2	112.8	86.8	115.2	172.1
1952	153.4	153.0	163.1	133.1	128.4	191.5	196.9	147.7	136.0	.....	.....	.....	155.9†

* Revision. † 9 month average.

Source: National Electrical Manufacturers Assn.

DOMESTIC COOKING APPLIANCE SHIPMENTS

Electric, Gas, Coal, Oil, and Wood Ranges and Cook Stoves

	1947	1948	1949	1950	1951	1952 (9 mos.)
Electric Ranges	1,043,711	1,363,742	903,806	1,612,387	1,244,645	881,105
Gas Ranges	2,268,526	2,579,265	1,954,910	2,893,681	2,250,656	1,509,120
Bungalow Ranges	70,179	61,428	38,013	52,705	56,800	31,918
Combination Ranges	171,517	128,585	87,044	100,053	63,079	37,103
Kerosene, Gasoline, Fuel Oil Ranges, Cook Stoves	559,579	466,777	185,939	190,776	132,833	88,101
Coal and Wood Ranges and Cook Stoves	449,356	295,527	169,928	151,162	120,700	72,270
Total Unit Shipments	4,562,868	4,895,324	3,339,640	5,000,764	3,868,713	2,419,617

Source: Department of Commerce

DOMESTIC HEATING APPLIANCE SHIPMENTS

Gas, Wood, Coal, and Oil Heaters Shown

	1947	1948	1949	1950	1951	1952 8 Mos.
Gas	2,752,465	2,083,990	1,452,834	2,023,278	1,896,619	882,404
Wood (sheet metal airtight types)	636,209	511,647	519,305	562,817	596,686	194,460
Coal and Wood (other than sheet metal airtight types)	669,439	691,959	432,228	325,698	450,941	186,231
Kerosene, Gasoline and Fuel Oil:						
Vaporizing pot-type	1,953,607	1,185,607	713,720	730,247	628,902	340,530
Sleeve-type	50,442	49,258	27,692	156,122	139,588	103,077
Unvented portable type	415,967	704,828	513,157	434,247	470,350	197,706
Total Unit Shipments	6,478,329	5,227,289	3,658,936	4,232,409	4,183,086	1,904,419

Source: Dept. of Commerce

Production of electric power . . . Electric Appliance sales index, employment, wages

4 METAL PRODUCTS

PRODUCTION OF ELECTRIC POWER IN MILLIONS OF KW-HR

Monthly Averages for Electric Utilities and Industrial Establishments

	Total	Electric Utilities	Industrial Establishments
1936 monthly average	.....	9,110	.....
1937 monthly average	.....	9,909	.....
1938 monthly average	.....	9,484	.....
1939 monthly average	13,442	10,637	2,806
1940 monthly average	14,992	11,820	3,172
1941 monthly average	17,359	13,732	3,627
1942 monthly average	19,429	15,493	3,931
1943 monthly average	22,295	18,147	4,148
1944 monthly average	23,294	19,016	4,278
1945 monthly average	22,605	18,541	4,064
1946 monthly average	22,467	18,598	3,869
1947 monthly average	25,617	21,312	4,305
1948 monthly average	28,067	23,558	4,509
1949 monthly average	28,711	24,251	4,471
1950 monthly average	33,124	28,144	4,981

	Total	Electric Utilities	Industrial Establishments
1951: January	36,726	31,418	5,308
February	33,102	28,219	4,883
March	36,172	30,920	5,252
April	34,431	29,293	5,138
May	35,136	29,871	5,265
June	34,966	29,840	5,126
July	35,435	30,392	5,042
August	37,510	32,326	5,184
September	35,296	30,275	5,020
October	37,775	32,441	5,334
November	37,313	32,095	5,217
December	38,459	33,143	5,316
1951 monthly average	36,193	30,853	5,176

	Total	Electric Utilities	Industria Establishments
1952: January	39,710	34,203	5,507
February	36,768	31,536	5,232
March	38,568	33,040	5,529
April	36,736	31,515	5,221
May	37,065	31,824	5,240
June	36,052	31,525	4,526
July	37,007	32,523	4,484
August	39,752	34,361	5,391 (P)
September	39,579	33,376	5,383
1952 monthly average	37,804	32,656	5,168

Source: Federal Power Commission

APPLIANCE EMPLOYMENT

Hours and Average Earnings

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$56.08	40.2	$1.395	125.5	154.8
1949	56.52	39.5	1.431	100.8	128.3
1950	61.56	41.0	1.502	113.3	139.8
1951	65.73	40.8	1.611	120.5	149.0
1952:					
Jan.	67.77	40.9	1.657	114.1	141.1
Feb.	67.98	40.9	1.662	112.5	139.4
Mar.	68.18	40.8	1.671	110.8	138.3
Apr.	66.60	40.0	1.665	109.9	137.6
May	67.39	40.4	1.668	108.7	135.9
June	67.83	40.4	1.679	107.6	134.8
July	67.54	40.3	1.676	105.8	133.3
Aug.	69.67	41.3	1.687	109.2	136.8

Source: Bureau of Labor Statistics

MOTORS AND GENERATORS

Index of Orders Integral HP Units

YEAR	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Avg.
1935	54.6	63.0	70.2	70.7	64.6
1936	75.2	109.4	103.2	112.2	100.0
1937	150.5	137.6	110.4	83.9	120.6
1938	68.7	68.4	61.3	67.1	66.4
1939	78.5	82.2	95.8	137.2	98.4
1940	102.7	124.9	147.7	229.4	151.2
1941	260.4	335.7	336.7	329.4	315.5
1942	457.0	664.6	554.4	435.6	527.9
1943	560.2	373.0	400.1	414.0	436.8
1944	284.6	341.8	345.2	314.1	321.4
1945	293.9	274.7	234.8	307.4	277.7
1946	288.1	418.1	468.0	492.8	416.7
1947	459.1	393.7	308.2	391.6	388.1
1948	294.8	329.2	289.9	301.2	303.8
1949	262.0	239.6	223.8	232.2	239.4
1950	338.7	333.7	551.1	674.2	474.4
1951	779.9	696.4	599.7	573.1	662.3
1952	517.1	516.5	462.5	.....	498.7*

* 9 month average.

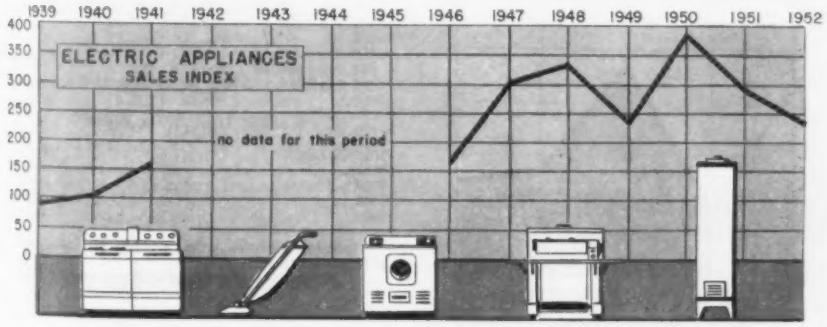
Source: National Electrical Manufacturers Assn.

VACUUM CLEANER SALES

Floor Uprite and Cylinder Units

Year	Floor Uprite & Cylinder Units
1933	580,644
1934	687,890
1935	850,109
1936	1,084,658
1937	1,210,191
1938	967,002
1939	1,084,505
1940	1,340,590
1941	1,670,129
1942	579,567
War Years 1943-44-45	
1946	2,289,441
1947	3,800,687
1948	3,360,849
1949	2,889,518
1950	3,500,000
1951	2,729,104
1952*	3,050,000

* Estimated. Source: Department of Commerce



RADIO AND TV PRODUCTION

Home, Auto, Portable and Television Units

Year	Radio Home	Radio Portable	Radio Auto	TV
1937	8,065,000	.....	1,750,000	.....
1938	7,100,000	.....	910,000	.....
1939	10,358,000	.....	1,400,000	.....
1940	11,860,000	.....	2,200,000	.....
1941	13,700,000	.....	2,600,000	.....
1942-45—War Years				
1946	14,031,000	.....	1,153,450	6,500
1947	14,082,662	2,458,277	3,459,061	178,571
1948	9,630,308	2,629,560	4,240,132	975,000
1949	5,961,196	1,843,383	3,595,421	3,000,000
1950	8,174,600	1,674,700	4,740,600	7,463,800
1951	6,751,452*	1,332,990	4,542,920	5,384 798
1952 (11 mos.)	4,876,353*	1,284,201	2,332,935	5,357,567

* Includes 777,155 clock radios in 1951 and 1,525,231 units in 1952. Source: Radio & Television Mfrs. Assn.

ELECTRIC APPLIANCES—MONTHLY SALES INDEX

Major Domestic Unit Sales Billed; Average Month 1936 = 100

Year	January	February	March	April	May	June	July	August	September	October	November	December	Average
1936	63.5	75.8	122.2	121.6	126.2	113.4	99.0	92.1	106.2	103.4	82.2	94.4	100.0
1937	95.2	104.4	170.4	163.0	148.3	144.4	117.1	102.9	109.1	90.9	62.5	58.1	113.9
1938	68.2	76.3	93.6	85.9	79.3	74.2	67.4	76.1	74.1	75.0	61.2	59.3	74.2
1939	87.5	90.9	111.2	93.9	102.7	95.7	73.1	86.8	92.2	93.3	78.6	65.2	89.2
1940	107.3	110.5	124.8	126.7	131.1	108.5	94.8	96.9	107.0	116.5	88.1	86.6	108.2
1941	133.5	146.1	179.1	191.2	188.1	186.4	185.5	148.0	179.2	145.8	110.1	131.5	160.4
Insufficient data available for computing indexes for the years 1942-1945 inclusive													
1946	105.3	84.3	102.3	128.3	121.4	168.6	181.9	206.6	197.3	234.0	228.2	215.6	164.5
1947	223.0	247.3	301.3	306.2	310.1	329.8	280.7	265.8	343.8	377.8	333.1	352.2	305.9
1948	324.6	329.6	389.7	341.1	318.3	358.5	275.8	334.0	387.7	363.8	341.8	279.3	337.0
1949	265.0	252.4	265.6*	203.4*	194.6*	226.0*	189.9*	239.8*	288.6*	266.5*	227.8*	237.7	238.1
1950	274.8	327.2	408.9	358.6	371.2	394.5	344.6	390.5	430.1	399.0	356.8	363.8	369.2
1951	361.2	341.8	420.3	325.3	295.2	284.4	160.6	209.3	264.9	304.5	268.5	218.1	289.5
1952	232.5	224.4	277.6	220.9	218.9	257.9	233.6	235.8	230.9	n.a.	n.a.	n.a.	237.0†

* Revised. † 9 month average. n.a.—Not available.

Source: National Electrical Manufacturers Association

4 PRODUCTS

Electrical Appliances: Toasters, freezers, flat irons, coffee makers, washers, dryers, etc. . . . Retail hardware sales volume.

ELECTRIC TOASTERS

Unit Sales Billed

	Automatic	Non-Automatic
1952 (10 mos.)	1,635,805	34,821
1951	2,630,096	92,293
1950	3,518,958	196,172
1949	3,151,953	178,737
1948	3,360,355	300,359

Source: National Electrical Manufacturers Assn.

ROASTERS AND BROILERS

Electric Unit Sales Billed

1952 (10 mos.)	408,816
1951	500,369
1950	471,423
1949	475,837
1948	784,626

Source: National Electrical Manufacturers Assn.

HOT PLATES AND DISC STOVES

Electric Unit Sales Billed*

1952 (10 mos.)	269,998
1951	352,758
1950	393,674
1949	334,427
1948	380,879

* 1650 Watts or less.
Source: National Electrical Manufacturers Assn.

ELECTRIC REFRIGERATORS

Domestic and Export Sales in Units

1952 (10 mos.)	2,866,611
1951	3,797,260
1950	5,848,579
1949	3,852,420
1948	4,712,144

Source: National Electrical Manufacturers Assn.

ELECTRIC WATER HEATERS

Domestic and Export Sales in Units

	Includes Steel Galvanized and Others
1952 (9 mos.)	462,069
1951	674,533
1950	798,682
1949	516,622
1948	716,182

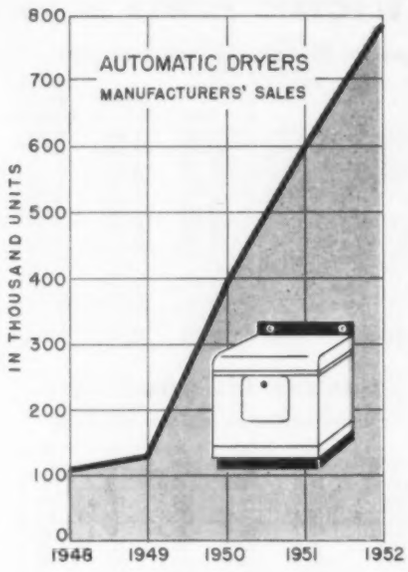
Source: National Electrical Manufacturers Assn.

ELECTRIC RANGES

Domestic and Export Sales in Units*

1952 (10 mos.)	1,093,030
1951	1,269,509
1950	1,602,382
1949	903,806
1948	1,363,742

* Includes bungalow-type and combination ranges employing electricity and other fuels.
Source: National Electrical Manufacturers Assn.

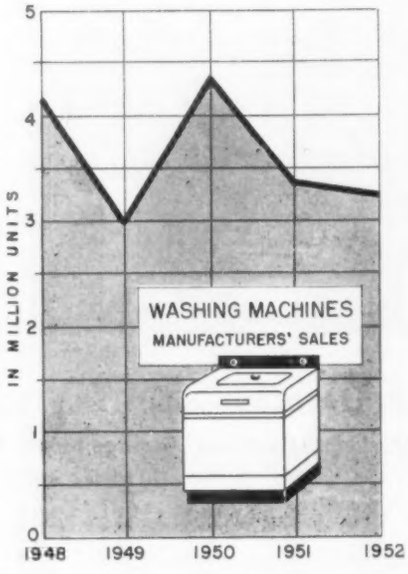


CLOTHES WASHERS AND DRYERS

Automatic, Manufacturers' Unit Sales

Year	Washers	Dryers
1948	4,120,389	88,099
1949	2,978,445	105,727
1950	4,311,018	318,488
1951	3,327,236	486,655
1952 (Ten months)	2,566,960	469,723

Source: American Home Laundry Mfrs. Assn.



The National Electrical Manufacturers' Assn. is the source for a considerable amount of data on these pages. Like most other similar groups however, it represents a majority, but not all manufacturers in the various appliance and machinery fields.

HOME FREEZERS

Domestic and Export Sales in Units*

1952 (10 mos.)	896,168
1951	736,328
1950	645,151
1949	313,957
1948	450,500

* Electric farm and home freezers.
Source: National Electrical Manufacturers Assn.

ELECTRIC AIR HEATERS

Unit Sales Billed

1952 (10 mos.)	382,785
1951	513,452
1950	892,871
1949	437,054
1948	707,114

Source: National Electrical Manufacturers Assn.

ELECTRIC COFFEE MAKERS

Vacuum and Percolators Sales

1952 (10 mos.)	930,171
1951	1,031,756
1950	1,196,638
1949	563,992
1948	627,737

Source: National Electrical Manufacturers Assn.

ELECTRIC FLAT IRONS

Unit Sales Billed

1952 (10 mos.)	4,157,451
1951	6,012,727
1950	5,066,575
1949	3,935,185
1948	4,626,776

Source: National Electrical Manufacturers Assn.

GRILLS AND WAFFLE IRONS

Electric Unit Sales Billed*

1952 (10 mos.)	606,841
1951	1,164,399
1950	1,749,005
1949	701,615
1948	1,450,255

* Includes sandwich grills, griddles and combination grills and waffle irons.
Source: National Electrical Manufacturers Assn.

RETAIL HARDWARE SALES

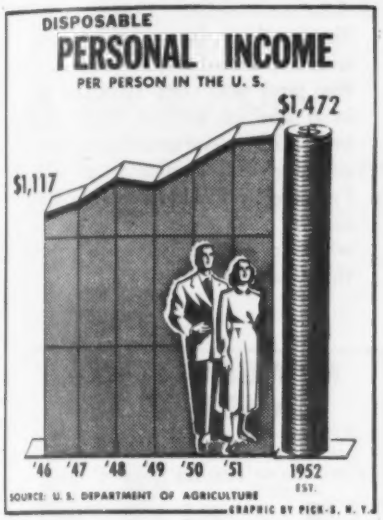
(In Millions of Dollars)

1943	$ 903
1944	1,030
1945	1,237
1946	1,911
1947	2,256
1948	2,494
1949	2,342
1950	2,634
1951	2,926
1952: January	163
February	170
March	198
April	229
May	244
June	233
July	214
August	217
Total—Eight Months	$1,663

Source: Department of Commerce

Expenditures for new construction . . . Plant and equipment spending . . . Housing starts . . . Transportation spending in U. S.

METAL PRO... 4



NEW HOUSING STARTS

Monthly Starts of Non-Farm Units

Month	New Non-Farm Units Started			
	1949	1950	1951	1952
January	50,000	78,700	85,900	64,900
February	50,400	82,900	80,600	77,700
March	69,400	117,300	93,800	103,900
April	88,300	133,400	96,200	106,200
May	95,400	149,100	101,000	109,600
June	95,500	144,300	132,500	103,500
July	96,100	144,400	90,500	104,000
August	99,000	141,900	89,100	99,000
September	102,900	120,600	96,400	98,000
October	104,300	102,500	90,000	101,000
November	95,500	87,300	74,500	87,000*
December	78,300	83,600	60,800	80,000*
Total	1,027,100	1,996,000	1,091,300	1,134,800*
Monthly av.	85,597	116,300	90,858	94,566*

* Estimated. Source: U. S. Department of Labor

PLANT, EQUIPMENT SPENDING

Expenditures In Millions

	Total All Industries	Manufacturing	Mining
1937	$6,732	$3,332	(1)
1938	4,524	1,832	(1)
1939	5,200	1,930	$380
1940	6,504	2,580	560
1941	8,190	3,400	680
1942	6,124	2,760	412
1943	4,536	2,252	360
1944	5,218	2,392	500
1945	6,630	3,210	440
1946	12,044	5,912	560
1947	16,300	7,460	700
1948	19,230	8,350	800
1949	18,120	7,250	740
1950	18,580	8,220	680
1951	26,332	11,130	911
1952*	27,484	12,808	843

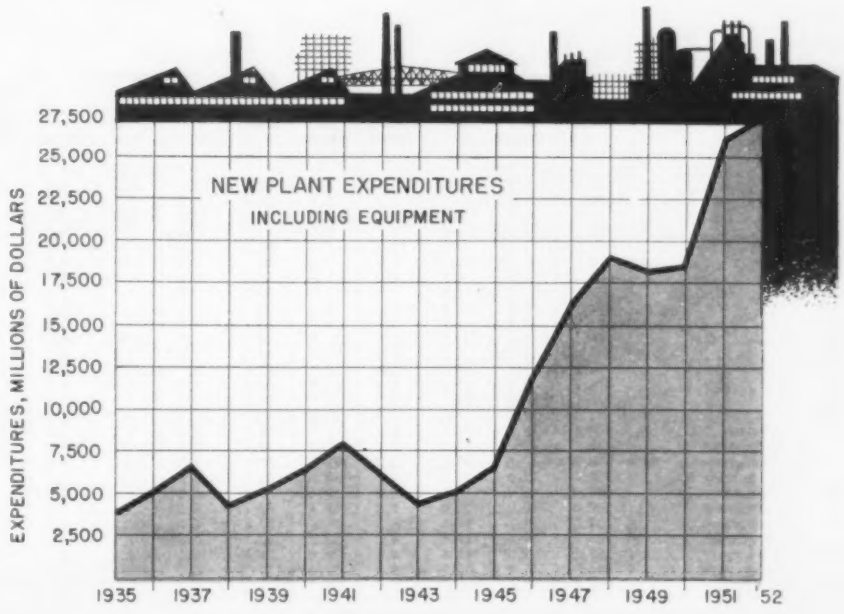
* Estimated.
1 Included in manufacturing.
Source: Securities & Exchange Commission; U. S. Dept. of Commerce

EXPENDITURES FOR NEW CONSTRUCTION BY TYPE

Spending for Private, Public, Utility, and Military Construction

Type of Construction	Expenditures (in millions of dollars)										
		1952									1952 (Nine Month Total)
	1951	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
Total new construction	$31,025	$2,193	$2,102	$2,345	$2,541	$2,778	$2,980	$3,062	$3,129	$3,112	$24,242
Private construction	21,684	1,518	1,464	1,616	1,690	1,811	1,925	1,995	2,040	2,037	16,096
Residential building (nonfarm)	10,973	720	676	799	849	922	979	1,023	1,048	1,053	8,069
Nonresidential building (nonfarm)	5,152	415	407	397	386	392	408	412	420	433	.....
Industrial	2,117	209	209	201	194	188	185	180	181	188	.....
Commercial	1,371	83	76	74	73	82	93	97	98	101	.....
Warehouses, office and loft buildings	544	39	36	33	33	34	37	39	43	44	.....
Stores, restaurants and garages	827	44	40	41	40	48	56	58	55	57	.....
Religious	452	31	30	29	23	29	32	34	37	38	.....
Educational	345	28	27	26	26	27	29	30	32	34	.....
Social and recreational	164	9	9	9	9	9	10	11	12	13	.....
Hospital and institutional	419	32	32	33	33	33	34	35	34	32	.....
Hotel	284	23	24	25	23	24	25	25	26	27	.....
Miscellaneous											
Farm construction	1,800	110	113	123	136	157	171	180	183	168	1,341
Public utilities	3,695	267	263	292	313	333	359	371	381	376	2,955
Railroad	399	30	27	30	32	33	36	36	37	37	.....
Local transit											
Pipeline											
Electric light and power	2,809	196	195	216	236	254	276	288	296	291	.....
Gas											
Telephone and telegraph	487	41	41	46	45	46	47	47	48	48	.....
Public construction	9,341	675	638	729	851	967	1,055	1,067	1,089	1,075	.....
Residential building	595	65	62	59	57	55	55	53	54	53	513
Nonresidential building	3,471	282	268	301	334	351	370	372	380	378	3,136
Industrial	958	90	85	108	134	151	166	168	168	162	.....
Educational	1,531	129	126	128	131	132	133	134	139	141	.....
Hospital and institutional	498	37	35	38	41	40	41	42	41	42	.....
Other nonresidential	484	26	22	27	28	28	30	30	32	33	.....
Military and naval facilities	1,019	113	105	122	135	150	153	155	152	153	.....
Highway	2,400	90	90	115	175	250	310	320	335	325	.....
Sewage disposal											
Water supply	706	48	46	51	56	60	62	63	64	62	.....
Miscellaneous public service enterprises	213	11	8	12	14	18	18	18	19	22	.....
Conservation and development	850	62	56	65	74	77	81	80	79	77	.....
All other public	77	4	3	4	6	6	6	6	6	5	.....

Source: Dept. of Commerce, Dept. of Labor



4 METAL PRODUCTS

Business sales and inventories . . . Consumer expenditures, classified. Income, taxes, savings, disposable income

SALES AND INVENTORIES (Billions of Dollars)

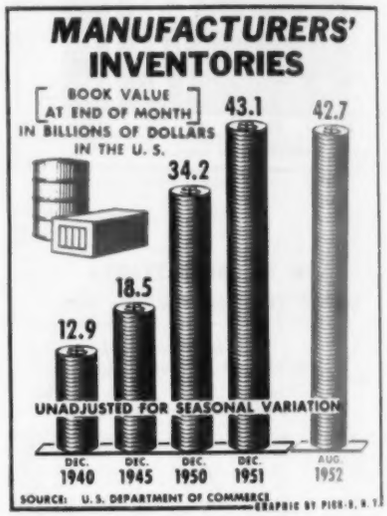
Manufacturing, Wholesale and Retail Trade, Monthly Figures†

	Business Sales				Business Inventories, Book Value—End of Month			
	Total Business Sales	Manufacturing (total)	Wholesale Trade (total)	Retail Trade (total)	Total Business Inventories	Manufacturing (total)	Wholesale Trade (total)	Retail Trade (total)
1939 monthly average	$11.1	$5.1	$2.5	$3.5	$20.2	$11.5	$3.2	$5.5
1940 monthly average	12.5	5.9	2.8	3.9	22.2	12.8	3.3	6.0
1941 monthly average	16.4	8.2	3.6	4.6	28.8	17.0	4.2	7.6
1942 monthly average	19.2	10.4	4.0	4.8	31.0	19.3	3.9	7.9
1943 monthly average	22.4	12.8	4.3	5.3	31.1	20.1	3.7	7.4
1944 monthly average	24.1	13.8	4.6	5.7	30.9	19.5	4.0	7.4
1945 monthly average	24.2	12.9	5.0	6.3	30.8	18.4	4.8	7.5
1946 monthly average	27.6	12.6	6.6	8.4	42.4	24.5	6.7	11.2
1947 monthly average	33.6	15.0	7.8	9.9	45.0	26.2	7.9	12.0
1948 monthly average	37.0	17.8	8.4	10.8	51.9	29.8	8.0	14.1
1949 monthly average	34.9	16.7	7.5	10.7	53.5	31.0	8.5	13.9
1950 monthly average	39.4	19.4	8.2	11.8	54.7	30.2	9.2	15.3
1951								
January	45.9	22.6	9.8	13.6	62.1	34.1	9.5	18.5
February	44.8	22.3	9.2	13.3	63.4	35.0	9.7	19.0
March	44.2	22.6	9.0	12.7	65.2	35.6	9.9	19.7
April	43.4	22.5	8.7	12.3	67.4	36.9	10.1	20.3
May	44.7	23.4	8.9	12.4	69.0	38.1	10.3	20.6
June	43.0	22.1	8.7	12.3	69.4	39.9	10.2	20.3
July	41.7	21.2	8.4	12.1	70.3	39.9	10.3	20.0
August	42.9	21.7	8.8	12.4	70.1	40.6	10.1	19.4
September	41.2	20.6	8.4	12.3	70.0	41.1	10.1	18.8
October	44.1	22.4	9.2	12.6	70.1	41.4	10.1	18.5
November	43.6	22.2	8.9	12.5	70.0	41.7	10.0	18.3
December	41.6	20.8	8.5	12.3	70.1	42.0	10.0	18.1
1951 monthly average	43.5	22.0	8.9	12.5	68.1	38.9	10.0	19.3
1952								
January	44.5	22.5	8.9	13.2	74.0	43.0	10.2	20.7
February	45.6	23.3	8.9	13.4	73.9	43.2	10.0	20.6
March	43.3	21.9	8.3	13.0	73.6	43.2	10.0	20.3
April	45.4	23.3	8.8	13.3	73.9	43.4	10.0	20.5
May	45.4	23.1	8.4	13.8	73.0	43.1	9.9	20.0
June	43.3	21.8	8.5	14.0	72.9	42.9	9.9	20.1
July	44.5	21.9	9.0	13.7	72.8	42.7	9.9	20.1
August	43.6	21.9	8.4	13.3	72.8	43.1	9.9	19.8
September	46.6	23.7	9.1	13.8	73.4	43.2	9.9	20.3

† Business sales and inventories are defined as the sum data for manufacturing and wholesale and retail trade.

Source: U. S. Dept. of Commerce

The outlook for metalworking and important developments of the past year are summed up in a special section beginning on p. 273. Automotive review and forecast begins on p. 232. For the machine tool picture see p. 243. For an idea of what to expect in Washington this year turn to p. 237.



CONSUMER EXPENDITURES, CLASSIFIED

Annual Rates in Billions of Dollars From 1935

		Durable Goods			Nondurable Goods						Services					
	Total	Automobiles and Parts	Furniture and Household Equipment	Other Durable Goods	Clothing and Shoes	Food and Alcoholic Beverages	Gasoline and Oil	Semi-durable Housefurnishings	Tobacco	Other Nondurable Goods	Household Operation	Housing	Personal Service	Recreation	Transportation	Other Services
1935	56.2	1.9	2.5	0.8	5.9	16.3	1.7	0.5	1.4	3.5	3.0	7.6	1.2	1.3	1.5	7.1
1936	62.5	2.3	3.1	1.0	6.5	18.5	1.9	0.7	1.5	3.8	3.2	7.9	1.3	1.4	1.7	7.7
1937	67.1	2.4	3.4	1.2	6.7	20.0	2.1	0.7	1.7	4.0	3.5	8.4	1.5	1.6	1.8	8.2
1938	64.5	1.8	3.0	1.1	6.8	19.0	2.1	0.8	1.7	3.9	3.4	8.7	1.4	1.5	1.7	7.9
1939	67.5	2.1	3.4	1.2	7.0	19.3	2.2	0.8	1.8	4.2	3.6	8.9	1.4	1.6	1.9	8.1
1940	72.1	2.1	3.8	1.3	7.4	20.7	2.3	0.8	1.9	4.5	3.8	9.2	1.8	1.7	2.0	8.3
1941	82.3	3.3	4.8	1.6	8.8	24.4	2.6	1.0	2.1	5.1	4.0	9.9	1.8	1.8	2.2	8.9
1942	91.2	0.7	4.5	1.9	11.0	30.5	1.9	1.1	2.3	6.0	4.5	10.8	2.1	2.1	2.7	9.3
1943	102.2	0.8	3.6	2.2	13.7	35.3	1.2	1.3	2.6	6.9	5.0	11.1	2.8	2.3	3.6	10.1
1944	111.6	0.9	3.7	2.5	15.3	38.9	1.2	1.4	2.6	7.7	5.6	11.7	2.7	2.7	3.7	11.1
1945	123.1	1.1	4.4	3.0	17.1	43.0	1.6	1.4	2.9	8.8	6.1	12.2	2.9	3.0	3.9	11.8
1946	147.8	4.4	8.2	3.9	18.6	51.0	3.0	1.8	3.5	8.9	6.3	13.1	3.5	3.7	4.5	13.4
1947	166.9	7.2	10.8	4.0	19.1	57.8	3.6	1.9	3.9	10.0	7.0	14.5	3.7	3.9	4.8	14.9
1948	178.8	8.2	11.4	4.0	20.0	61.1	4.1	1.9	4.1	10.9	7.7	15.9	3.7	3.9	5.1	16.8
1949	178.4	9.4	10.2	3.8	19.3	60.0	4.2	1.9	4.1	10.1	8.0	17.1	3.7	4.0	5.2	18.1
1950	193.6	12.3	13.0	3.9	18.8	60.9	5.1	2.0	4.4	11.0	9.3	19.9	3.8	3.9	5.2	20.0
1950: First quarter	182.4	10.8	12.5	3.6	17.7	58.3	4.9	1.9	4.3	10.5	8.8	17.9	3.7	3.8	5.1	18.8
Second quarter	185.2	11.0	12.0	3.6	18.4	59.1	5.1	1.9	4.3	10.6	9.0	18.1	3.7	3.9	5.1	19.2
Third quarter	198.5	13.5	16.2	3.8	19.7	62.5	5.2	2.3	4.3	10.9	9.3	18.4	3.7	3.8	5.1	19.6
Fourth quarter	198.4	12.9	12.4	4.1	19.2	62.7	5.2	2.0	4.5	11.2	9.8	20.5	3.9	3.9	5.3	20.7
1951: First quarter	208.8	12.4	14.6	4.3	20.4	67.4	5.5	2.4	4.6	11.8	10.1	20.9	3.9	3.9	5.5	21.0
Second quarter	202.4	10.8	11.0	4.0	19.5	67.1	5.5	2.0	4.6	11.3	10.2	21.3	4.0	3.9	5.7	21.3
Third quarter	204.0	9.7	11.4	4.1	19.7	67.9	5.5	2.1	4.7	11.6	10.1	21.7	4.0	4.1	5.7	21.6
Fourth quarter	206.7	9.4	11.4	4.2	20.2	69.1	5.6	2.0	4.8	11.9	10.2	22.2	4.1	3.9	5.8	21.9
1952: First quarter	213.2	9.6	11.3	4.3	20.6	71.6	5.9	2.0	5.2	12.5	10.7	22.9	4.2	4.1	5.9	22.3
Second quarter	214.9	11.3	10.8	4.3	20.0	72.3	6.0	2.0	5.1	12.4	10.9	23.2	4.2	4.1	5.8	22.6
Third quarter	215.0	8.8	11.2	4.3	20.3	73.2	6.1	2.1	5.1	12.1	10.9	23.5	4.3	4.3	5.9	22.9

† Seasonally adjusted quarterly totals at annual rates.

Source: Dept. of Commerce

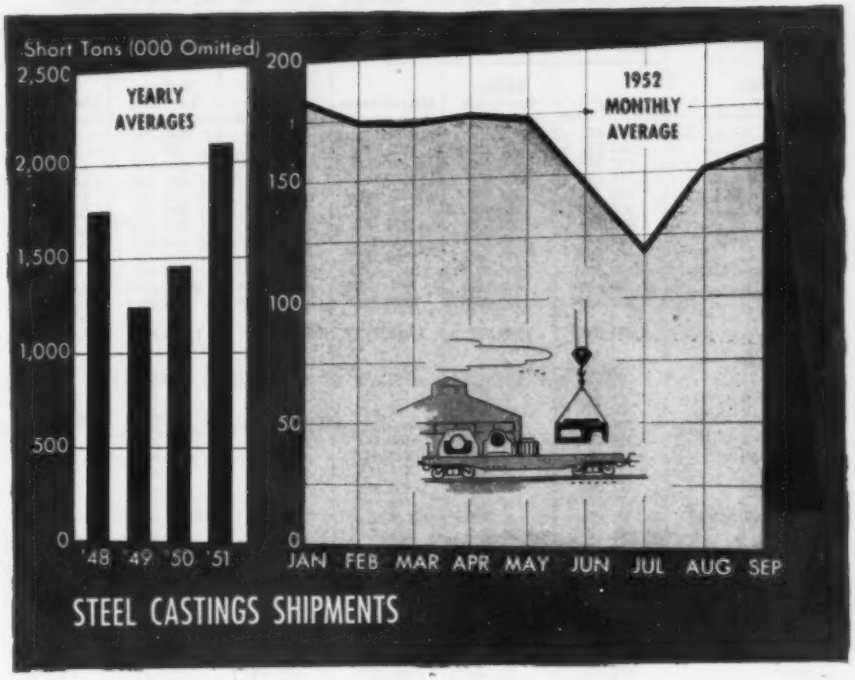
The Iron Age

METAL INDUSTRY FACTS

SECTION 5

CASTING AND FORGING

METAL POWDER PRICES • OUTPUT • SMOKE CONTROL



IN THIS SECTION:

Page

AIR POLLUTION CONTROL . 456

ALUMINUM CASTINGS 453

CASTINGS
- Aluminum 453
- Copper 453
- Gray iron 451, 452
- Magnesium 453
- Malleable 451
- Radiation 452
- Steel 450, 451
- Zinc 453

COPPER
- Castings 453
- Powder 454

DIECASTINGS, LEAD 453

EMPLOYMENT
- Hours, earnings, rates
  - Forging 452
  - Gray iron, semi-steel foundries 450
  - Iron and steel foundries 450
  - Malleable castings 451
  - Nonferrous foundries 453
  - Pressed Metals 453
  - Steel castings 450

FOUNDRIES
- Eqpt. orders, shipments 452
- In U. S. 455

FORGINGS 452

IMPORTS IRON POWDER .. 454

INDUSTRIAL FURNACES ... 453

IRON
- Castings 450, 451
- Powder 454

Page

JET ENGINE ALLOYS 452

LEAD
- Diecastings 453
- Powder 454

MAGNESIUM CASTINGS ... 453

ORDERS
- Foundry equipment 452
- Magnesium castings 453
- Malleable castings 451
- Steel castings 450

POWDERED METALS 454

PRICES
- Copper powder 454
- Iron powder 454
- Zinc powder 451

PROCESSING PLANTS, NO. IN U. S. 454, 455

PRODUCTION
- Steel castings 450

RADIATION CASTINGS 452

Page

SALES
- Industrial furnaces 453
- Steel castings 450

SHIPMENTS
- Aluminum castings 453
- Copper castings 453
- Copper powder 454
- Foundry equipment 452
- Gray iron castings 450, 451
- Iron powder 454
- Lead diecastings 453
- Lead powder 454
- Magnesium castings 453
- Radiation castings 452
- Steel castings 451
- Steel forgings 452
- Zinc castings 453

STEEL FORGINGS 452

STEEL CASTINGS 450, 451

ZINC
- Castings 453
- Powder 454

5 STEEL CASTINGS

Steel castings production . . . Employment and earnings in gray and malleable iron and steel foundries . . . steel shipments.

STEEL CASTINGS, PRODUCTION, SALES, ORDERS BY TYPE

Total Production and Sales Broken Into Railway Specialties and Miscellaneous

Year	Production, Net Tons			Orders Booked, Less Cancellations, Net Tons		
	Total	Railway Specialties	Miscellaneous	Total	Railway Specialties	Miscellaneous
1930	991,872	368,690	623,182	884,433	333,199	551,234
1935	398,988	94,329	304,659	400,157	97,357	302,800
1940	797,947	290,255	507,692	816,919	266,418	550,501
1941	1,316,027	471,810	844,217	1,561,864	560,286	1,001,578
1942	1,679,178	309,352	1,369,826	2,187,347	219,145	1,968,202
1943	1,928,645	248,664	1,679,981	2,333,420	352,760	1,980,660
1944	1,843,386	338,007	1,505,379	1,914,294	322,630	1,591,664
1945	1,484,957[1]	311,833[1]	1,173,124[1]	1,529,912	352,382	1,177,530
1946	1,043,358[1]	286,131[1]	757,227[1]	1,069,842	283,511	786,331
1947	1,203,504[1]	341,987[1]	861,517[1]	1,330,081	449,432	880,649
1948	1,760,894[2]	442,258[2]	839,143[2]	5,514,224[3]	2,308,056[3]	3,206,158[3]
1949	1,243,502[2]	232,976[2]	623,321[2]	2,351,354[3]	809,888[3]	1,541,466[3]
1950	1,461,089	261,897	1,199,732	3,726,831	1,569,697	2,158,134
1951:						
Jan.	174,056	42,805	131,251	675,384	285,639	389,745
Feb.	163,976	42,565	121,411	706,989	331 674	375,315
March	190,365	43,898	146,469	779,717	330,238	449,481
April	181,908	41,545	140,363	846,947	333,256	513,691
May	188,956	39,845	149,111	881,702	335,928	845,774
June	184,424	42,337	142 087	895,054	342 560	552,494
July	147,251	27,585	119,666	929,978	338,426	591,552
Aug.	177,096	41,763	135,333	944,211	332,417	611,794
Sept.	160 695	35,500	125.195	918,038	316,558	601 480
Oct.	189,929	35,906	154,023	891,508	279,935	611,553
Nov.	176,729	30,702	146,027	665,029	262,490	602,539
Dec.	165,110	29,942	135,168	846,436	245,059	601,377
	2,100,495	454,391	1,647,094	10,180,993	3,734,198	6,446,895
1952:						
Jan.	183,738	31,482	152,256	869,299	231,529	637,770
Feb.	174,626	27,953	146,673	856,872	223,400	633,472
Mar.	173,694	27,782	145,912	857,115	236,741	620,374
Apr.	175,075	29,798	145,277	842,970	212,940	630,030
May	173,635	30,995	142,640	804,695	200,614	604,081
June	141,628	26,815	114,813	846,459	183,323	663,036
July	119,036	18,694	100,342	855,046	173,536	671,510
Aug.	150,232	21,626	128,606	809,354	160,415	648,939
Sept.	158,392	17,843	140,549	781,929	158,562	623,367

[1] Shipments beginning with last quarter of 1945.
[2] Difference between total and classified use is the tonnage for own use and not for sale.
[3] Unfilled orders or backlog.

Note: Approximate coverage of industry is as follows: 1920-30, 80 pct; 1935, 90 pct; 1940-44, 96 pct; 1945-46, 100 pct; 1947, preliminary estimates of complete coverage, based on a sample of the foundries.

Source: Bureau of Census

IRON AND STEEL FOUNDRIES

Employment and Average Earnings

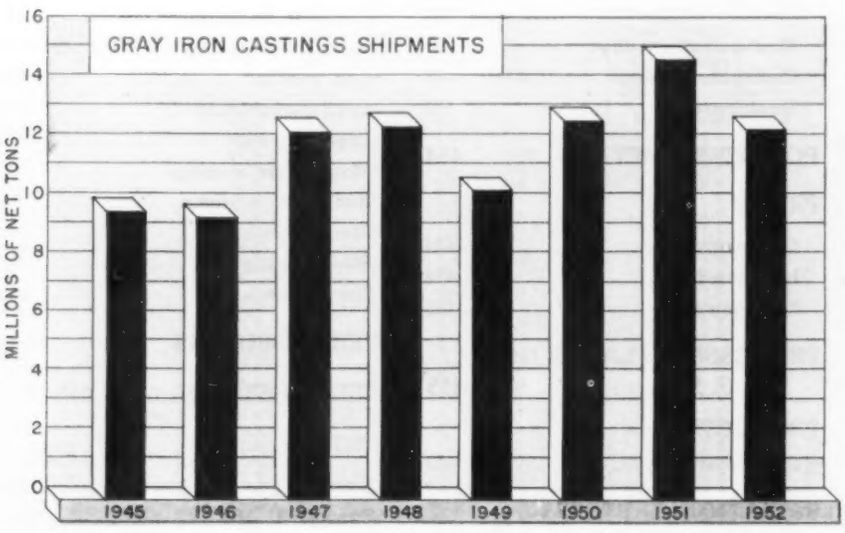
	All Employees	Production and Related Workers			
	Number (thousands)	Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	259.3	230.9	$58.45	40.7	$1.436
1949	217.0	188.9	55 09	37.2	1.481
1950	231.8	204.0	65.32	41.9	1.559
1951	279.9	248.9	71.95	42.4	1.697
1952:					
Jan.	278.3	246.0	72.86	41.8	1.743
Feb.	275.3	242.8	72.32	41.3	1.751
Mar.	272.1	240.2	72.02	40.9	1.761
Apr.	272.1	240.3	71.00	40.5	1.753
May	270.6	238.9	72.02	40.9	1.761
June	265.6	233.7	71.88	40.7	1.766
July	252.5	221.1	68.53	39.5	1.735
Aug.	261.6	228.9	69.28	39.5	1.754

GRAY IRON, SEMISTEEL FOUNDRIES

Average Hours and Earnings of Workers

	Avg. Weekly Earnings, $	Avg. Weekly Hours	Avg. Hourly Earnings, $
1944	51.34	47.7	1.077
1945	50.88	46.2	1.101
1946	50.70	42.5	1.194
1947*	55.24	42.3	1.308
1948	57.46	40.9	1.405
1949	54.38	37.5	1.450
1950	65.06	42.3	1.538
1951	70.01	42.2	1.659
1952: Jan.	70.59	41.4	1.705
Feb.	68.75	40.3	1.706
Mar.	69.63	40.6	1.715
Apr.	68.60	40.0	1.715
May	68.80	40.0	1.720
June	68.58	39.9	1.717
July	64.33	38.5	1.671
Aug.	68.58	39.8	1.723

* All data for 1947 through 1951 calculated on revised BLS basis.



STEEL CASTINGS EARNINGS

Average Hours and Earnings of Workers

	Avg. Weekly Earnings, $	Avg. Weekly Hours	Avg. Hourly Earnings, $
1942	43.77	45.8	0.955
1943	48.79	46.4	1.052
1944	51.59	46.2	1.116
1945	49.98	43.9	1.138
1946	48.45	38.8	1.248
1947*	53.94	39.6	1.362
1948	59.93	40.8	1.470
1949	56.73	37.3	1.521
1950	65.43	41.1	1.592
1951	75.68	43.1	1.756
1952: Jan.	77.01	42.9	1.795
Feb.	78.78	43.5	1.811
Mar.	76.97	42.2	1.824
Apr.	75.20	41.8	1.799
May	76.97	42.5	1.811
June	76.83	42.1	1.825
July	74.66	41.2	1.817
Aug.	73.95	40.7	1.817

* All data for 1947 through 1951 calculated on revised BLS basis. Source: Bureau of Labor Statistics

Shipments of castings: Alloy and carbon steel, gray iron including pipe, malleable iron production, shipments and orders . . .

IRON CA[illegible] 5

SHIPMENTS OF STEEL CASTINGS, ALLOY AND CARBON

By Types of Furnace and Grade of Steel, Net Tons

	1948	1949	1950	1951	1952 January	February	March	April	May	June	July	August	September
Total	1,760,032	1,243,502	1,461,667	2,100,494	183,738	174,626	173,694	175,075	173,635	141,628	119,036	150,232	158,392
Carbon steel	1,367,708	944,232	1,066,062	1,580,375	133,985	125,484	125,787	126,628	125,309	101,850	81,576	107,203	109,011
Alloy (including stainless)	392,324	299,270	395,605	520,119	49,753	49,142	47,907	48,447	48,326	39,778	37,460	43,029	49,381
Electric furnace	758,383	571,324	712,781	1,041,710	95,304	87,800	89,102	90,482	82,717	76,246	59,757	74,990	77,988
Bessemer					1,009	1,140	1,073	1,182	1,132	1,063	860	997	997
Open hearth, basic	1,001,649	672,178	748,886	1,085,048	54,920	50,054	51,319	51,981	52,059	40,958	35,263	45,069	43,914
Open hearth, acid					39,241	36,091	38,913	37,836	37,521	25,577	21,813	28,641	30,442
All other					2,925	2,732	2,657	2,143	2,392	1,238	993	3,767	4,587

Source: Bureau of Census

SHIPMENTS OF GRAY IRON CASTINGS INCLUDING PIPE

Iron Castings Plus Soil and Pressure Pipe, Net Tons

	1949	1950	1951	1952 January	February	March	April	May	June	July	August	September
Total Gray Iron Castings: Shipments	10,549,284	12,905,562	15,038,751	1,199,285	1,155,143	1,172,017	1,204,801	1,100,630	835,263	636,141	1,001,629	1,119,373
For Sale	5,517,527	6,880,352	8,483,710	694,498	654,843	660,920	652,962	620,049	502,322	431,889	602,025	665,680
For Own Use	5,031,757	6,025,210	6,555,041	504,787	500,310	511,097	551,839	480,581	332,941	204,252	399,604	493,693
Unfilled Orders for Sale				1,800,905	1,768,434	1,711,037	1,614,426	1,459,305	1,445,521	1,409,684	1,513,166	1,450,723
Molds for Heavy Steel Ingots, Shipments	1,776,242	2,303,661	1,250,532	110,263	105,918	110,607	85,239	91,980	10,575	10,223	99,760	107,987
Chilled Iron R. R. Car Wheels, Shipments	555,569	514,074	568,272	53,551	47,649	49,747	42,600	39,648	44,066	40,783	35,606	39,912
Cast Iron Pressure Pipe and Fittings Shipments	1,029,743	1,203,762	1,464,921	35,729	107,669	115,843	117,929	117,586	103,335	96,784	108,313	107,847
Cast Iron Soil Pipe and Fittings Shipments	533,310	761,317	888,180	45,149	44,712	50,231	50,023	53,485	51,500	56,305	62,485	64,663
Misc. Gray Iron Castings Shipments	6,624,420	8,117,748	4,468,862	359,806	348,885	334,492	347,121	317,150	292,846	227,794	295,681	309,299

Source: Bureau of Census

MALLEABLE CASTINGS, LABOR

Average Earnings and Hours for Industry

	Avg. Weekly Earnings, $	Avg. Weekly Hours	Avg. Hourly Earnings, $
1941	31.57	41.7	0.757
1942	37.15	42.5	0.874
1943	46.14	46.5	0.994
1944	50.98	47.9	1.064
1945	49.83	45.4	1.099
1946	49.51	40.9	1.211
1947*	54.39	40.2	1.353
1948	59.19	40.4	1.465
1949	54.30	35.7	1.521
1950	65.46	41.3	1.585
1951	71.98	41.9	1.718
1952: Jan.	70.79	40.2	1.761
Feb.	70.09	39.8	1.761
Mar.	68.85	38.9	1.770
Apr.	68.58	38.7	1.772
May	71.18	39.7	1.793
June	72.10	39.9	1.807
July	64.81	36.7	1.766
Aug.	60.13	34.3	1.753

* All data for 1947 through 1951 calculated on revised BLS basis.

MALLEABLE IRON CASTINGS SHIPMENTS, ORDERS

Production, Shipments and New Orders, Net Tons

	Shipments, Net Tons			New Orders, Less Cancellations, Net Tons			Shipments, Monthly Index*
	Total	For Sale	For Own Use	Total	For Sale	For Own Use	
1930	475,371	.....	.....	432,722	.....	.....	.....
1935	455,208	.....	.....	452,611	.....	.....	96.1
1938	296,003	208,597	87,406	289,384	203,172	86,212	62.5
1939	466,068	331,421	134,647	489,482	354,249	135,233	98.4
1940	556,209	400,818	155,391	571,929	414,310	157,619	117.4
1941	832,173	619,365	212,808	884,881	663,688	221,193	175.7
1942	746,008	590,804	155,204	859,102	703,167	155,935	157.5
1943	844,639	653,884	190,756	1,054,224	826,422	227,802	178.3
1944	878,233	619,588	258,645	969,483	685,511	283,972	185.4
1945	790,731	520,887	269,844	766,711	426,159	340,552	166.9
1946	752,028	452,355	299,673	.....	483,368	.....	158.8
1947	895,054	513,228	381,826	.....	447,975	.....	188.9
1948	933,265	525,212	408,053	.....	460,189	.....	197.0
1949	713,330	371,214	34,416	430,530	226,483	204,047	150.6
1950	920,502	512,192	408,310	.....	646,307	.....	194.3
1951	1,082,047	652,883	429,164	.....	2,997,655	.....	228.4
1952: January	87,003	54,988	32,015	.....	202,799	.....	.....
February	82,898	50,129	32,769	.....	193,061	.....	.....
March	80,960	49,084	31,876	.....	196,896	.....	.....
April	89,270	56,337	32,933	.....	198,215	.....	.....
May	81,770	51,476	30,294	.....	180,382	.....	.....
June	74,446	46,511	27,935	.....	173,353	.....	.....
July	45,266	29,675	15,591	.....	166,517	.....	.....
August	63,716	39,308	24,408	.....	162,832	.....	.....
September	75,950	45,849	30,101	.....	168,367	.....	.....

Source: Bureau of Census

Note: Statistics represent coverage of approximately 90 pct for 1923-43; thereafter coverage is essentially complete.
* Based on average monthly shipments for 5-year period 1935-39 (39,478 short tons).

5 G FORGING

Strategic jet-engine alloy list . . . steel forgings, cast iron radiation and foundry equipment shipments . . . average weekly wages and hours.

SHIPMENTS OF STEEL FORGINGS—NET TONS

		Drop and Upset				Press and Open Hammer			
		Carbon Steel		Alloy Steel		Carbon Steel		Alloy Steel	
	Total*	For Sale	For Own Use	For Sale	For Own Use	For Sale	For Own Use	For Sale	For Own Use
1947	1,333,731	692,544	.....	279,538	.....	224,738	.....	136,911	.....
1948	1,413,266	693,874	.....	344,928	.....	227,682	.....	146,802	.....
1949	1,138,628	585,474	.....	280,970	.....	162,852	.....	109,332	.....
1950	1,800,096	741,140	.....	639,447	.....	293,998	.....	125,511	.....
1951	2,551,135	809,582	.....	510,954	.....	376,641	.....	21,799	.....
1952: Jan.	279,372	77,005	36,484	52,756	33,591	37,878	13,420	23,135	5,103
Feb.	277,908	75,729	37,082	49,313	31,229	38,323	17,775	24,122	4,335
Mar.	266,372	80,024	35,774	47,744	33,789	24,037	16,093	24,636	4,275
Apr.	276,139	76,916	42,320	48,820	39,436	19,785	17,048	22,765	9,049
May	263,300	68,250	40,461	46,021	41,378	18,518	16,548	23,051	9,073
June	224,453	61,374	30,786	40,487	35,845	15,656	14,126	17,881	8,298
July	131,657	40,721	10,853	28,444	12,424	11,500	5,039	16,163	6,513
Aug.	196,428	48,533	29,485	32,304	28,865	15,419	11,489	23,777	8,576
Sept.	.....	.....	.....	.....	.....	.....	.....	.....	.....

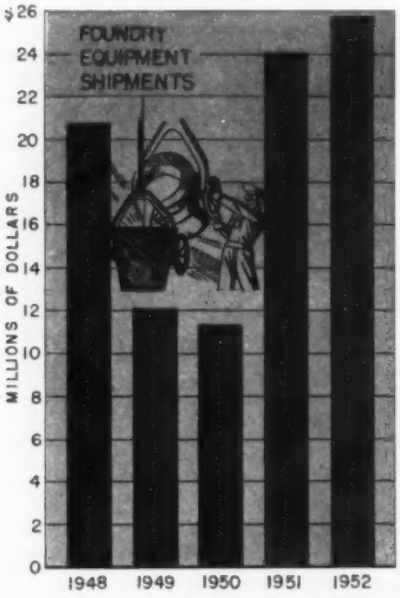
* Prior to May, 1951, this table included only commercial shops shipping over 300 tons a month. Now the coverage is based on both "captive" and commercial shops with 50 tons of shipments per month and over. Source: Bureau of Census

FOUNDRY EQUIPMENT ORDERS AND SHIPMENTS

Index and Dollar Volume for New Orders and Repairs

	New Orders Closed New Equipment,		Shipments $		
	$	Index	New Equipment,	Repairs	Total
1948	18,817,669	.....	20,747,890	10,451,628	31,190,518
1949	9,206,468	.....	12,074,055	7,401,326	19,475,381
1950	23,394,594	.....	11,203,568	8,564,698	19,768,266
1951	24,213,638	.....	24,026,150	13,122,340	37,148,490
1952: January	1,862,185	404.5	2,470,990	1,050,171	3,521,161
February	922,485	200.4	2,400,533	1,254,814	3,655,347
March	1,427,245	310.0	2,219,522	1,079,688	3,299,210
April	1,773,002	385.1	2,408,582	1,121,741	3,530,323
May	1,036,915	225.2	2,205,193	1,026,495	3,231,688
June	1,628,671	353.8	2,362,057	1,023,317	3,385,374
July	1,583,121	343.9	1,606,622	671,719	2,680,341
August	1,434,404	311.6	1,604,814	937,446	2,542,260
September	1,684,911	365.9	1,580,809	969,752	2,550,561

Source: Foundry Equipment Manufacturers Assn.



CAST IRON RADIATION SHIPMENTS

By Type and Dollar Value

	Cast Iron Boilers 1000 lb	Value ($1000)	Cast Iron Radiators and Convectors 1000 sq ft	Value ($1000)
1949	206,296	.....	35,888	.....
1950	267,911	.....	48,175	.....
1951	210,208	$47,594	42,512	26,396
1952:				
Jan.	11,318	2,603	2,784	1,783
Feb.	10,211	2,430	2,226	1,484
Mar.	9,161	2,329	2,074	1,368
Apr.	9,480	2,409	1,760	1,155
May	13,346	3,194	2,145	1,408
June	16,962	3,968	2,925	1,904
July	17,285	3,989	2,915	1,910
Aug.	24,037	5,538	3,974	2,592

Source: Bureau of Census

EARNINGS IN FORGING INDUSTRY

Average Earnings Per Worker

	Avg. Weekly Earnings, $	Avg. Weekly Hours	Avg. Hourly Earnings, $
1937	28.84	40.9	0.711
1938	23.97	32.3	0.744
1939	29.45	38.4	0.767
1940	32.56	41.2	0.791
1941	40.93	45.9	0.894
1942	49.93	47.9	1.047
1943	56.88	48.2	1.180
1944	59.62	47.7	1.251
1945	56.79	45.0	1.262
1946	52.77	39.9	1.324
1947*	59.79	40.7	1.469
1948	65.16	40.8	1.597
1949	63.18	38.2	1.654
1950	74.09	41.6	1.781
1951	84.87	43.3	1.960
1952:			
Jan.	91.30	44.8	2.038
Feb.	89.85	44.0	2.042
Mar.	87.51	43.0	2.035
Apr.	84.44	41.8	2.020
May	85.03	42.2	2.015
June	84.06	41.8	2.011
July	75.89	38.6	1.966
Aug.	77.66	39.6	1.961

* All data for 1947 through 1951 calculated on revised BLS basis. Source: Bureau of Labor Statistics

HIGH-TEMPERATURE JET-ENGINE ALLOYS

Popular Grades Listed in Order of Their Descending Strategic Alloy

	C	Cr	Ni	Co	Mo	W	Cb	Ti	Fe	Other
S-816	0.40	20	20	43.7	4	4	3.75	....	2.8	.....
S-590	0.45	20	19.5	19.5	4	4	4	....	27	.....
25 Ni	0.17	19	24.5	42.5	....	10	1.5	....	1	.....
M-203	0.07	19.5	24.5	36.5	....	12	1.5	2.15	1.6	Al-0.75
I-336 Ta+Cb	0.19	19.2	15.5	50	....	12	....	....	1.3	Ta+Cb-0.9
M-204	0.07	18.5	24.5	40.5	....	12	1.2	....	1.6	B-0.22
M-205	0.07	18.5	24.5	37.5	....	12	1.2	....	1.6	Al-2.75 B-0.22
G-18 B	0.40	13	13	10	2	2.5	3	....	54.3	.....
L-605	0.10	19.5	10	51.3	....	14.5	....	....	2.5	B-0.4
X-40	0.48	25	10.3	55	....	7.4	....	....	1	.....
H. S. 21	0.30	26.5	3	62	5.25	....	....	....	1.5	.....
X-63	0.40	23	10	58.2	6	....	....	....	1	.....
422-19	0.40	25	15.3	51	5.5	....	....	....	1.3	.....
I-1360	0.10	10	70.5	....	5	....	2	....	4.5	Al-6.0 B-0.3
N-155	0.13	21	20	20	3	2.2	1	....	30	N-0.13
Inconel X	0.05	15	72.5	....	....	....	1	2.5	7	Al-0.7 Cu-0.05
Nimonic 90	0.08	19.5	55.5	19.5	....	....	....	2.5	0.5	Al-1.2
K-42 B	0.05	18	42	22	....	....	....	2.0	14	Al-0.5
Refractaloy 26	0.05	18	37	20	3	....	....	2.8	18	Al-0.2
AISI 347	0.08	18	11	....	....	....	1	....	67.5	.....
M-252	0.10	19	53.5	10	10	....	....	2.5	2	Al-0.75
Hastelloy C	0.09	16.5	54	1.2	17	4.5	....	....	5	V-0.3
Nimonic 80-A	0.05	20	75	....	....	....	....	2.15	0.5	Al-1.1 Cu-0.07
Inconel	0.05	14.5	77.5	....	....	....	....	....	6.5	Cu-0.2
Inconel W	0.05	15	73.5	....	....	....	....	2.5	7	Al-0.7 Cu-0.05
M-600	0.08	19	55.5	....	7	....	....	2.3	13	Al-1.1
Incoloy C	0.10	20.5	34	....	2	....	....	....	41.5	.....
AISI 310	0.10	25	20	....	....	....	....	....	53	.....
M-813	0.08	18	35	....	4	....	....	2.25	37.5	Al-1.4
Hastelloy B	0.10	....	65	....	28	....	....	....	5	V-0.4
Timken	0.09	16	25	....	6.25	....	....	....	50.5	N-0.15
A-286	0.05	15	26	....	1.15	....	....	1.6	53.5	Al-0.17 V-0.2
19-9 DX	0.30	19	9	....	1.5	1.3	....	0.5	66.5	.....
Discaloy 24	0.05	13.5	26	....	3	....	....	1.6	54	Al-0.3
AISI 321	0.06	17.5	10	....	....	....	....	0.5	69.5	.....
H. S. 88	0.07	12.5	15	....	2	0.6	....	0.6	67	B-0.15

Courtesy General Electric Co.

Shipments of non-ferrous castings . . .
Wages and hours in non-ferrous foundries
and pressed metal shops . . . Furnace sales

CASTING FO 5

ALUMINUM CASTINGS, SHIPMENTS

For Sale, in Thousands of Pounds

	Total	Sand	Perm. Mold	Die	Other	Unfilled Orders
1946	294,805	129,977	100,628	63,632	568	.....
1947	340,725	125,025	122,418	91,879	1,403	.....
1948	340,156	09,978	123,233	104,527	2,418	.....
1949	257,258	85,671	87,924	81,305	2,358	.....
1950	406,844	132,987	133,819	138,267	1,771	.....
1951	414,418	155,153	131,930	120,276	7,059	.....
1952:						
Jan.	35,403	14,470	9,701	9,322	1,910	109,654
Feb.	34,172	14,043	10,597	8,952	580	110,327
Mar.	36,925	15,166	11,301	9,582	876	106,776
Apr.	38,323	15,209	11,983	10,363	768	104,338
May	36,654	14,733	11,832	9,588	501	100,802
June	35,815	14,727	9,685	9,590	1,813	103,329
July	30,508	12,885	8,906	8,717	....	106,673
Aug.	36,369	15,147	9,672	8,981	2,569	112,852

Source: Department of Commerce.

Page 456 in this section contains digests of smoke control ordinances of 69 U. S. cities, compiled by THE IRON AGE with the cooperation of smoke control officials in these cities and counties. A listing of important trade associations and technical societies in the fields covered by this section begins on p. 470. . . . For a calendar of meetings in the metalworking field scheduled for 1953 see p. 477.

PRESSED METAL EARNINGS

Average Hours and Earnings per Worker

	Production and Related Workers		
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	$58.39	40.3	$1.449
1949	60.30	39.7	1.519
1950	66.15	41.5	1.594
1951	70.50	40.8	1.728
1952: Jan.	75.77	42.0	1.804
Feb.	76.02	42.0	1.810
Mar.	76.19	41.7	1.827
Apr.	73.68	40.8	1.806
May	74.90	41.2	1.818
June	74.30	40.8	1.821
July	68.01	38.1	1.785
Aug.	73.61	40.6	1.813

Source: Bureau of Labor Statistics

NONFERROUS FOUNDRIES, LABOR

Employment, Hours and Earnings

	All Employees	Production and Related Workers			
	Number (thousands)	Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	85.2	73.2	$59.96	40.0	$1.499
1949	75.8	63.3	60.92	39.0	1.562
1950	93.0	78.8	67.65	41.5	1.630
1951	109.6	91.9	73.83	41.9	1.762
1952:					
Jan.	111.2	92.4	78.88	42.8	1.843
Feb.	111.8	92.9	76.94	42.0	1.832
Mar.	111.9	93.0	77.24	42.0	1.839
Apr.	113.7	94.5	74.79	40.8	1.833
May	113.4	94.3	75.05	40.7	1.844
June	112.7	93.4	75.79	41.1	1.844
July	110.9	92.8	72.55	39.8	1.832
Aug.	111.3	94.8	74.06	40.1	1.847

Source: Bureau of Labor Statistics

COPPER CASTINGS SHIPMENTS

Copper and Copper-Base, 000 omitted

For Sale and Own Use

	Sand	Permanent Mold	Die	All Other	Total All Types
1947	969,261	51,800	13,138	27,663	1,061,862
1948	947,044	60,552	13,642	29,217	1,050,455
1949	671,080	38,767	9,499	24,475	743,821
1950	953,590	55,614	15,099	32,670	1,056,973
1951	1,056,226	69,943	13,132	38,240	1,177,541
1952: Jan.	80,376	6,233	875	2,132	89,616
Feb.	77,813	5,204	758	2,456	86,231
Mar.	79,437	6,182	675	2,348	88,642
Apr.	75,590	5,914	784	2,172	84,460
May	73,723	5,420	646	2,114	81,903
June	67,748	4,858	748	2,005	75,359
July	58,931	3,637	574	1,620	64,762
Aug.	70,030	4,830	660	1,574	77,094

Source: Bureau of Commerce

MAGNESIUM CASTINGS

Mg and Mg Base Alloys, 000 Omitted

	Shipments		Unfilled Orders*
	Total	For Sale	
1947	8,214	7,313	.....
1948	9,359	8,047	.....
1949	11,053	9,764	.....
1950	15,224	13,310	.....
1951	33,135	28,596	.....
1952: January	3,569	3,063	14,047
February	3,368	2,940	14,459
March	3,319	2,972	13,279
April	3,051	2,751	13,244
May	3,001	2,698	13,041
June	2,948	2,699	12,094
July	2,654	2,393	12,948
August	2,722	2,486	13,178

* For sale only

Source: Bureau of Census

INDUSTRIAL FURNACE SALES

Fuel Fired and Electric Types

Year	Fuel-Fired Industrial Furnaces, Including Hot Rolling Steel, $	Electric Resistance Furnaces, $	Total, $
1941	34,124,751	13,719,111	47,843,862
1942	89,709,507	39,052,122	128,761,629
1943	16,951,800	12,855,328	29,807,128
1944	20,770,834	10,233,349	31,004,183
1945	22,102,225	9,484,210	31,586,435
1946	20,383,884	8,429,840	29,813,724
1947	22,589,770	7,799,584	30,389,354
1948	15,655,654	5,838,410	21,492,064
1949	9,982,440	5,284,021	16,658,600*
1950	37,132,673	13 880,065	53,433,079*
1951	88,095,775	43,497,718	131,593,493*
1952 (10 mos.)†		21,903,611	59,564,635

† Does not include steel mill fuel fired furnaces. These figures constitute approximately 80% of the industry. * Includes "miscellaneous."

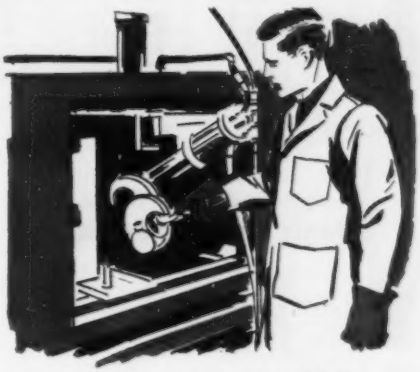
Source: Industrial Furnace Mfrs. Assn.

LEAD DIECASTINGS SHIPMENTS

Lead and Lead-Base (000 Omitted)

	For Sale and Own Use Total Shipments
1947	18,165
1948	22,887
1949	13,743
1950	20,997
1951	34,876
1952:	
Jan.	3,604
Feb.	2,842
March	2,692
April	3,048
May	2,638
June	3,109
July	2,441
Aug.	2,777

Source: Bureau of Census

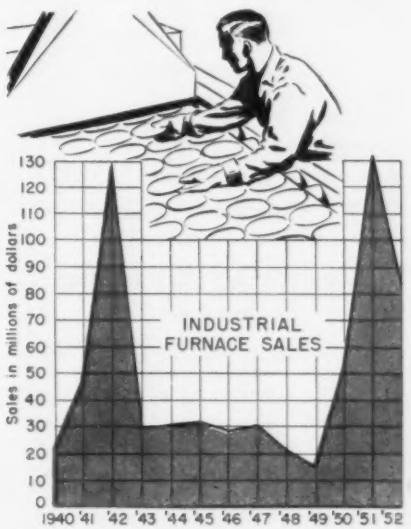


ZINC CASTINGS SHIPMENTS

Zinc and Zinc-Base Alloys (1000 lb)

	Diecastings	All Other	Total
1947	438,693	7,030	445,723
1948	457,088	6,030	463,118
1949	397,001	3,561	400,562
1950	574,196	5,136	579,332
1951	492,807	2,143	494,950
1952: January	37,873	154	38,027
February	34,135	172	34,307
March	34,962	121	35,083
April	37,189	123	37,312
May	35,641	134	35,775
June	33,732	97	33,829
July	23,375	87	23,462
August	29,822	133	29,955

Source: Bureau of Census



5 METAL POWDERS

Copper, lead, zinc, iron powder prices and shipments . . . Iron powder imports . . . Number of U. S. stamping, metal powder part shops.

IRON POWDER, AVERAGE MONTHLY PRICES

Cents per pound, F.O.B. Mill Unless Otherwise Specified

	Swedish Sponge c.i.f. N. Y., Ocean Bags, −100 Mesh	Domestic Sponge 98+Pct Fe, Carload Lots, −100 Mesh	Electrolytic, Annealed, 99.5+Pct Fe, −100 Mesh	Electrolytic, Unannealed, −325 Mesh 99+Pct Fe	Hydrogen Reduced, −300 Mesh 98+Pct Fe	Carbonyl, 5-10 Microns, 98=99.8+ Pct Fe
1949 Aver.	7.8 to 9.0	9.0 to 15.0	31.0 to 39.5	48.5	63.0 to 80.0	90.0 to 175.0
1950 Aver.	7.4 to 9.0	9.0 to 15.0	38.0 to 39.5	48.5	63.0 to 80.0	70.0 to 135.0
1951 Aver.	7.4 to 9.0	12.65 to 16.16	40.45	51.48	63.0 to 80.0	80.64 to 146.0
1952						
Jan.	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
Feb.	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
March	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
April	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
May	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
June	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
July	7.4 to 9.0	15.5 to 17.0	42.5	53.5	63.0 to 80.0	83.0 to 148.0
Aug.	7.4 to 10.9	15.5 to 17.0	44.0	60.00	63.0 to 80.0	83.0 to 148.0
Sept.	10.9	15.5 to 17.0	44.0	60.00	63.0 to 80.0	83.0 to 148.0
Oct.	10.9	15.5 to 17.0	44.0	60.00	63.0 to 80.0	83.0 to 148.0
Nov.	10.9	15.5 to 17.0	44.0	60.00	63.0 to 80.0	83.0 to 148.0
Dec.	10.9	15.5 to 17.0	44.0	60.00	63.0 to 80.0	83.0 to 148.0
1952 Aver.	8.57 to 9.79	15.5 to 17.0	43.1	56.2	63.0 to 80.0	83.0 to 148.0

IMPORTS OF IRON POWDERS

Net Tons

1948	2,590
1949	3,108
1950	7,607
1951	12,850
1952 (10 months):	
Sweden	3,600
Germany	78
Holland	31
Total (10 months)	3,709

COPPER POWDER SHIPMENTS

Net Tons

	Total	Bearings and Parts	Friction Materials	Graphite Metal Brushes	Misc.
1945	6,550	.....	.....	.....	.....
1946	7,380	5,900	560	330	590
1947	8,700	7,170	615	385	600
1948	8,580	6,560	675	575	770
1949	7,014	4,374	1,158	450	1,032
1950	13,109	9,488	1,271	957	1,393
1951	13,571	11,013	963	390	1,205
1952*	8,979	6,731	1,081	262	905

* Estimate.

METAL POWDER PART PLANTS

Plants With 20 Workers or More

Alabama	..	Nevada	..
Arizona	..	New Hampshire	..
Arkansas	..	New Jersey	8
California	1	New Mexico	..
Colorado	..	New York	11
Connecticut	7	North Carolina	..
Delaware	..	North Dakota	..
District of Columbia	..	Ohio	9
Florida	..	Oklahoma	..
Georgia	..	Oregon	1
Idaho	..	Pennsylvania	11
Illinois	9	Rhode Island	..
Indiana	4	South Carolina	..
Iowa	1	South Dakota	..
Kansas	1	Tennessee	2
Kentucky	1	Texas	1
Louisiana	..	Utah	..
Maine	..	Vermont	..
Maryland	1	Virginia	..
Massachusetts	10	Washington	..
Michigan	13	West Virginia	..
Minnesota	1	Wisconsin	7
Mississippi	..	Wyoming	..
Missouri	1	Total	94
Montana	..		
Nebraska	..		

(Source: THE IRON AGE Basic Marketing Data)

AVERAGE COPPER POWDER PRICE

Cents per lb, F.O.B. Mill—100 Mesh

	Electrolytic	Reduced
1949 Average	29.82	30.06
1950 Average*	9.75	9.87
1951 Average*	10.67	10.0
1952 Monthly Average*		
January	10.75	10.0
February	10.75	10.0
March	10.75	10.0
April	10.75	10.0
May	10.75	10.0
June	10.75	10.0
July	10.75	10.0
August	10.75	10.0
September	10.75	10.0
October	10.75	10.0
November	10.75	10.0
December	10.75	10.0
1951 Average*	10.75	10.0

* Change in pricing method; above price plus metal value.

SHIPMENTS OF IRON POWDER

Total Net Tons, Four Major Classes*

	Total	Bearings and Parts	Friction Materials	Magnetic Cores	Miscellaneous
1944	1,720	.....	.....	.....	.....
1945	1,950	.....	.....	.....	.....
1946	2,485	1,350	30	415	690
1947	3,115	1,560	30	600	845
1948	3,520	1,685	25	990	820
1949	3,235	1,746	14	935	540
1950	3,942	1,570	23	1,611	738
1951	3,651	2,150	1.8	900	600
1952†	3,075	1,650	0.7	175	1,250

* Domestic. † Estimates.

STAMPING PLANTS IN U. S.

Plants With 20 Workers or More

Alabama	40	Nevada	23
Arizona	4	New Hampshire	401
Arkansas	14	New Jersey	1
California	649	New Mexico	925
Colorado	31	New York	34
Connecticut	331	North Carolina	2
Delaware	7	North Dakota	1018
District of Columbia	6	Ohio	28
Florida	36	Oklahoma	31
Georgia	51	Oregon	583
Idaho	2	Pennsylvania	139
Illinois	1202	Rhode Island	9
Indiana	377	South Carolina	3
Iowa	115	South Dakota	58
Kansas	43	Tennessee	135
Kentucky	61	Texas	9
Louisiana	19	Utah	9
Maine	14	Vermont	38
Maryland	92	Virginia	37
Massachusetts	397	Washington	33
Michigan	759	West Virginia	311
Minnesota	136	Wisconsin	3
Mississippi	10	Wyoming	
Missouri	193	Total	8445
Montana	1		
Nebraska	29		

(Source: THE IRON AGE Basic Marketing Data)

AVERAGE ZINC POWDER PRICE

Cents per lb, F.O.B. Mill—100 Mesh

1948 Average	15.41 to 18.71
1949 Average	15.41 to 18.71
1950 Average	20.50 to 23.85
1951 Average	22.54 to 29.25
1952 Monthly Average:	
Jan.	23.0 to 30.5
Feb.	23.0 to 30.5
March	23.0 to 30.5
April	23.0 to 30.5
May	23.0 to 30.5
June	23.0 to 30.5
Aug.	23.0 to 30.5
Sept.	23.0 to 30.5
Oct.	23.0 to 30.5
Nov.	23.0 to 30.5
Dec.	23.0 to 30.5
1952 Average	23.0 to 30.5

SHIPMENTS OF LEAD POWDER

Net Tons

	Total	Bearings	Friction Materials	Protective Coatings	Miscl.
1945	5195	...	...	...	...
1946	905	55	195	193	462
1947	785*	53	165	187	380
1948	1040	74	319	141	506
1949	790	68	315	210	350
1950	918	112	230	132	444
1951	1280	415	380	110	375
1952*	1344	315	215	101	663

* Estimate.

Number of forging, heat-treating, die-casting shops and various types of foundries in operation in the United States.

5 CASTING, FORGING

MALLEABLE IRON FOUNDRIES

Plants With 20 Workers or More

Alabama	1	Nevada	1
Arizona	..	New Hampshire	1
Arkansas	1	New Jersey	5
California	7	New Mexico	..
Colorado	..	New York	15
Connecticut	7	North Carolina	1
Delaware	1	North Dakota	..
District of Columbia	..	Ohio	25
Florida	..	Oklahoma	1
Georgia	1	Oregon	..
Idaho	1	Pennsylvania	16
Illinois	23	Rhode Island	1
Indiana	12	South Carolina	1
Iowa	1	South Dakota	..
Kansas	..	Tennessee	..
Kentucky	..	Texas	4
Louisiana	1	Utah	..
Maine	..	Vermont	..
Maryland	..	Virginia	..
Massachusetts	4	Washington	4
Michigan	12	West Virginia	2
Minnesota	2	Wisconsin	13
Mississippi	..	Wyoming	..
Missouri	2	Total	166
Montana	..		
Nebraska	..		

(Source: THE IRON AGE Basic Marketing Data)

NUMBER OF STEEL FOUNDRIES

Plants With 20 Workers or More

Alabama	6	Nevada	1
Arizona	2	New Hampshire	3
Arkansas	1	New Jersey	11
California	29	New Mexico	..
Colorado	5	New York	22
Connecticut	7	North Carolina	1
Delaware	3	North Dakota	..
District of Columbia	1	Ohio	35
Florida	1	Oklahoma	1
Georgia	5	Oregon	6
Idaho	..	Pennsylvania	67
Illinois	24	Rhode Island	2
Indiana	16	South Carolina	..
Iowa	3	South Dakota	..
Kansas	3	Tennessee	3
Kentucky	1	Texas	12
Louisiana	4	Utah	2
Maine	..	Vermont	..
Maryland	3	Virginia	3
Massachusetts	9	Washington	17
Michigan	19	West Virginia	3
Minnesota	4	Wisconsin	18
Mississippi	..	Wyoming	..
Missouri	11	Total	382
Montana	..		
Nebraska	1		

(Source: THE IRON AGE Basic Marketing Data)

DIECASTING SHOPS IN U. S.

Plants With 20 Workers or More

Alabama	1	Nevada	..
Arizona	1	New Hampshire	2
Arkansas	2	New Jersey	37
California	71	New Mexico	..
Colorado	6	New York	57
Connecticut	21	North Carolina	..
Delaware	..	North Dakota	..
District of Columbia	..	Ohio	73
Florida	2	Oklahoma	1
Georgia	4	Oregon	2
Idaho	1	Pennsylvania	39
Illinois	94	Rhode Island	10
Indiana	28	South Carolina	1
Iowa	5	South Dakota	..
Kansas	1	Tennessee	4
Kentucky	3	Texas	9
Louisiana	..	Utah	..
Maine	..	Vermont	..
Maryland	1	Virginia	5
Massachusetts	15	Washington	2
Michigan	69	West Virginia	1
Minnesota	13	Wisconsin	19
Mississippi	1	Wyoming	..
Missouri	20	Total	622
Montana	..		
Nebraska	3		

(Source: THE IRON AGE Basic Marketing Data)

NONFERROUS FOUNDRIES

Plants With 20 Workers or More

Alabama	16	Nevada	..
Arizona	2	New Hampshire	12
Arkansas	2	New Jersey	71
California	150	New Mexico	1
Colorado	14	New York	138
Connecticut	55	North Carolina	9
Delaware	2	North Dakota	..
District of Columbia	1	Ohio	192
Florida	11	Oklahoma	11
Georgia	17	Oregon	7
Idaho	..	Pennsylvania	140
Illinois	132	Rhode Island	8
Indiana	70	South Carolina	6
Iowa	24	South Dakota	..
Kansas	13	Tennessee	16
Kentucky	6	Texas	28
Louisiana	8	Utah	4
Maine	6	Vermont	1
Maryland	11	Virginia	13
Massachusetts	64	Washington	18
Michigan	120	West Virginia	9
Minnesota	24	Wisconsin	56
Mississippi	2	Wyoming	1
Missouri	29	Total	1531
Montana	3		
Nebraska	8		

(Source: THE IRON AGE Basic Marketing Data)

GRAY IRON FOUNDRIES

Plants With 20 Workers or More

Alabama	54	Nevada	..
Arizona	2	New Hampshire	15
Arkansas	6	New Jersey	72
California	97	New Mexico	1
Colorado	12	New York	138
Connecticut	40	North Carolina	31
Delaware	5	North Dakota	1
District of Columbia	1	Ohio	225
Florida	11	Oklahoma	17
Georgia	40	Oregon	17
Idaho	1	Pennsylvania	250
Illinois	156	Rhode Island	9
Indiana	105	South Carolina	11
Iowa	48	South Dakota	1
Kansas	25	Tennessee	48
Kentucky	18	Texas	38
Louisiana	10	Utah	7
Maine	9	Vermont	12
Maryland	17	Virginia	31
Massachusetts	74	Washington	26
Michigan	160	West Virginia	13
Minnesota	44	Wisconsin	93
Mississippi	6	Wyoming	1
Missouri	40	Total	2048
Montana	3		
Nebraska	9		

(Source: THE IRON AGE Basic Marketing Data)

FORGE SHOPS IN OPERATION

Plants With 20 Workers or More

Alabama	22	Nevada	..
Arizona	1	New Hampshire	7
Arkansas	4	New Jersey	72
California	92	New Mexico	..
Colorado	13	New York	141
Connecticut	53	North Carolina	10
Delaware	3	North Dakota	..
District of Columbia	3	Ohio	185
Florida	12	Oklahoma	8
Georgia	18	Oregon	15
Idaho	3	Pennsylvania	199
Illinois	140	Rhode Island	12
Indiana	59	South Carolina	1
Iowa	22	South Dakota	1
Kansas	12	Tennessee	20
Kentucky	18	Texas	45
Louisiana	10	Utah	7
Maine	8	Vermont	8
Maryland	16	Virginia	17
Massachusetts	98	Washington	21
Michigan	101	West Virginia	24
Minnesota	31	Wisconsin	41
Mississippi	7	Wyoming	2
Missouri	33	Total	1625
Montana	4		
Nebraska	6		

(Source: THE IRON AGE Basic Marketing Data)

SHEET METAL DEPARTMENTS

Plants With 20 Workers or More

Alabama	50	Nevada	1
Arizona	8	New Hampshire	11
Arkansas	11	New Jersey	297
California	531	New Mexico	3
Colorado	35	New York	634
Connecticut	127	North Carolina	48
Delaware	14	North Dakota	4
District of Columbia	5	Ohio	783
Florida	41	Oklahoma	50
Georgia	64	Oregon	43
Idaho	3	Pennsylvania	479
Illinois	774	Rhode Island	26
Indiana	273	South Carolina	7
Iowa	110	South Dakota	5
Kansas	55	Tennessee	64
Kentucky	62	Texas	172
Louisiana	25	Utah	10
Maine	13	Vermont	13
Maryland	83	Virginia	42
Massachusetts	229	Washington	68
Michigan	514	West Virginia	29
Minnesota	121	Wisconsin	255
Mississippi	10	Wyoming	3
Missouri	153	Total	6403
Montana	4		
Nebraska	41		

(Source: THE IRON AGE Basic Marketing Data)

HEAT TREATING SHOPS

Plants With 20 Workers or More

Alabama	28	Nevada	..
Arizona	6	New Hampshire	22
Arkansas	9	New Jersey	275
California	287	New Mexico	..
Colorado	21	New York	540
Connecticut	229	North Carolina	28
Delaware	9	North Dakota	..
District of Columbia	5	Ohio	652
Florida	15	Oklahoma	29
Georgia	25	Oregon	32
Idaho	2	Pennsylvania	506
Illinois	540	Rhode Island	72
Indiana	231	South Carolina	4
Iowa	64	South Dakota	3
Kansas	21	Tennessee	38
Kentucky	27	Texas	92
Louisiana	9	Utah	10
Maine	10	Vermont	20
Maryland	48	Virginia	22
Massachusetts	280	Washington	46
Michigan	483	West Virginia	27
Minnesota	62	Wisconsin	144
Mississippi	8	Wyoming	1
Missouri	118	Total	5116
Montana	1		
Nebraska	15		

(Source: THE IRON AGE Basic Marketing Data)

5 POLLUTION

A digest of smoke control and air pollution control rules and regulations of 69 U. S. municipalities and counties.

CHECK LIST OF AIR POLLUTION CONTROL ORDINANCES

Based on a Special Survey by THE IRON AGE

City	Air Contaminants Prohibited[1]	Test Method[2]	Dense Smoke Standard[3]	Installation Control	Inspection Frequency	Sales Reports Required	Type of Fuel Control[4]	Board Empowered to Make Rules
Akron, Ohio	DS FA (8) F	ASME	R3	Yes	Annual	....	.....	Yes
Allegheny County, Pa.	DS FA (12)	ASME	R2**	Yes	.....	Yes	User-Sales	Yes
Atlanta	DS FA (2)	.....	R3	Yes	.....	Yes	.....	....
Baltimore	DS FA (6)	ASME	R2	Yes	Periodic	Yes	User-Sales	Yes
Birmingham	DS	.....	R3	Yes	Periodic	....	User	Yes
Boston	DS FA	.....	R2	....	.....	....	.....	Yes
Buffalo	DS FA F	.....	R3	Yes	Annual	Yes	User-Sales	Yes
Camden, N. J.	DS FA F	.....	R2	Yes	Annual	Yes	User	....
Charlotte, N. C.	DS FA (3-8) F	ASME	R2	Yes	Periodic	....	.....	....
Chattanooga, Tenn.	DS FA F	.....	R2	Yes	Annual	....	.....	....
Chicago	DS FA F	.....	R3	Yes	Annual	No	User	None
Cincinnati	DS FA (3-7) F	.....	U4	Yes	Annual	....	User-Sales	Yes
Cleveland	DS FA (5) F	ASME	R2	Yes	Annual	....	User	Yes
Columbus, Ohio	DS FA (8) F	ASME	R2	Yes	Annual	Yes	User	Yes
Dayton	DS FA (3-7)	ASME	R2	Yes	Periodic	....	.....	Yes
Denver	DS FA F	.....	R2	Yes	.....	....	User	Yes
Detroit	DS FA (4) F	.....	R2	Yes	Annual	Yes	User-Sales	Yes
Duluth	DS F	.....	R3	Yes	.....	....	.....	....
Erie, Pa.	DS FA F	.....	R2	....	.....	....	.....	....
Evansville, Ind.	DS	.....	R2	....	.....	....	.....	Yes
Gary, Ind.	DS FA	.....	None	....	.....	....	.....	....
Grand Rapids, Mich.	DS FA	.....	R3	Yes	.....	....	.....	....
Harrisburg, Pa.	DS	.....	R3	Yes	Periodic	....	.....	....
Hartford	DS	.....	R3**	Yes	.....	....	.....	....
Houston	DS	.....	....	....	.....	....	User	....
Indianapolis	DS FA (9) F	ASME	R2	Yes	Annual	Yes	User-Sales	Yes
Jacksonville, Fla.	DS FA	.....	None	....	.....	....	.....	....
Kansas City	DS FA F	.....	R3	Yes	Annual	....	User	Yes
Knoxville, Tenn.	DS FA F	ASME	R2	Yes	.....	Yes	.....	....
Lansing, Mich.	DS	.....	U1	....	.....	....	.....	Yes
Los Angeles County	DS FA (1) F	.....	R2	Yes	Periodic	....	User	Yes
Louisville (Jefferson Co.)	DS FA (7-8) F	ASME	R2	Yes	Annual	....	User	Yes
Memphis	DS FA F	.....	R3	Yes	.....	....	User	....
Miami	DS FA F	.....	R3	Yes	Quarterly	....	.....	Yes
Milwaukee County	DS FA (8) F	ASME	R2	Yes	Periodic	Yes	User-Sales	Yes
Minneapolis	DS FA F	ASME	R3	Yes	.....	....	User	....
Nashville, Tenn.	DS FA (8) F	ASME	R2	Yes	Annual	Yes	User-Sales	Yes
New Orleans	DS	.....	None	Yes	.....	....	.....	....
New York	DS FA F	Visual-ASME	Visual	Yes	Periodic	....	User	Yes
Newark, N. J	DS FA F	.....	R2	Yes	.....	....	User	Yes
Oakland, Calif.	DS F	.....	None	....	.....	....	.....	....
Omaha, Neb.	DS FA (8) F	ASME	R2	Yes	Annual	Yes	.....	Yes
Peoria, Ill.	DS FA F, 400	ASME	R3	Yes	Annual	Yes	.....	Yes
Philadelphia	DS FA (8) F	ASME	R2	Yes	Periodic	....	.....	Yes
Pittsburgh	DS FA (4)	.....	R2	Yes	Annual	....	User-Sales	....
Portland, Ore.	DS FA	.....	R3**	....	.....	....	User-Sales	....
Providence	DS FA (8) F	.....	R2	Yes	Annual	Yes	User-Sales	Yes
Reading, Pa.	DS FA IF	.....	R2	Yes	Annual	Yes	Sales	Yes
Richmond, Va.	DS FA (11) F	ASME	R3	Yes	.....	Yes	.....	Yes
Rochester, N. Y.	DS FA (7)	ASME	R2	....	.....	....	.....	....
Salt Lake City	DS FA F	.....	R2	Yes	.....	Yes	User	....
San Francisco	DS FA	.....	R3**	....	.....	....	.....	....
Spokane	DS	.....	None	....	.....	....	.....	....
Springfield, Mass.	DS	.....	None	....	.....	....	.....	....
St. Louis	DS FA (10) F	ASME	R2	Yes	.....	Yes	User-Sales	Yes
St. Paul	DS	.....	R3	....	.....	....	.....	....
Syracuse, N. Y	DS FA (3-8) F	.....	R2	Yes	.....	Yes	User-Sales	....
Tacoma, Wash.	DS FA (7-3) F	.....	R2	Yes	Periodic	....	User	Yes
Tampa, Fla.	None	.....	....	Yes	.....	....	.....	....
Toledo	DS FA (8) F	ASME	R2	Yes	Annual	....	.....	Yes
Toronto	DS FA (3-8) F	ASME	R2(10) R3(8)	Yes	Periodic	....	.....	Yes
Trenton, N. J.	DS FA	.....	None	....	.....	....	.....	....
Utica, N. Y.	DS FA (6) F	.....	R2	....	.....	....	.....	....
Wilmington, Del.	DS	.....	R3	....	.....	....	.....	....
Yonkers, N. Y	DS FA F	.....	R2	Yes	.....	....	.....	....
Youngstown	DS FA (8) F	ASME	R2	Yes	Annual	Yes	User-Sales	Yes
Wilmington, Del.	DS	.....	R3	....	.....	....	.....	....
Yonkers, N. Y.	DS FA F	.....	R2	Yes	.....	....	.....	....
Youngstown	DS FA (6) F	ASME	R2	Yes	Annual	Yes	User-Sales	Yes

EXPLANATORY NOTES

1 "DS" refers to Dense Smoke as measured by the Ringlemann chart or to the "Umbrascope" in which one thickness of 60% opacity glass equals No. 1 scale, two thicknesses equals No. 2 scale, etc.

2 Those marked "ASME" use the American Society of Mechanical Engineers test code. Others will apparently accept any recognized or accurate method.

3 "R" stands for the Ringlemann scale, "U" for the Umbrascope. Smoke density comparable to one thickness of 60 pct opacity glass equals "R1", two thicknesses "R2", three thicknesses "R3", etc.

4 "User" indicates that person or plant burning fuel is subjected to regulations governing type, method of burning and other such factors. "Sales" indicates that fuel distributors are also regulated, under licensing or some other such arrangement.

FA (—) Limits of emission of solids vary as follows:

(1) .2% by volume SO_2
.4 gr./cu.ft. adjusted to 12% CO_2 at gas temperature except that dust or fumes may not exceed amounts shown in table of ordinance varying from 48/100% of the process weight at 50 lb/hr. to 67/1000% of the process weight of 60,000 lb/hr. Maximum permitted 40 lb/hr.

(2) 90% collection entering collector, minimum.

(3) 85% collection entering collector, minimum.

(4) .3 gr./cu.ft. at 500° F. and 50% excess air.

(5) .425 gr./cu.ft. at 500° F. 50% excess air. Muat collect 75% in equipment installed before ordinance and 85% with new equipment.

(6) .75 gr./cu.ft. at 500° and 50% excess air which amoun not more than .2 gr./cu.ft. shall be larger than 325 mesh, 44 microns.

(7) .85 lb per 1,000 lb of gas—50% excess air.

(8) .85 lb per 1,000 lb of gas adjusted to 12% CO_2.

(9) .75 gr./cu.ft. at 500° F. 50% excess air of which not more than .2 gr./cu.ft. at 850° F. shall be larger than 325 mesh.

(10) .85 lb per 1,000 lb of gas containing 50% excess air. Maximum .5 lb per 1,000 lb of gas shall be larger than 325 mesh.

(11) 2 lb per 1,000 lb of gases at 12% CO_2—must collect 75%.

(12) .85 lb per 1000 lb of gas—50% excess air, 85% efficiency.

**Greater than

Data for the tabular material at the left were collected by mail questionnaires returned by smoke control officials in the cities and counties listed.

Air pollution and the laws regulating it have now become a serious problem for industry. While this table is not all-inclusive, it is intended to serve as a guide to the type of ordinance which other areas use and which may have to be considered in studying new plant locations.

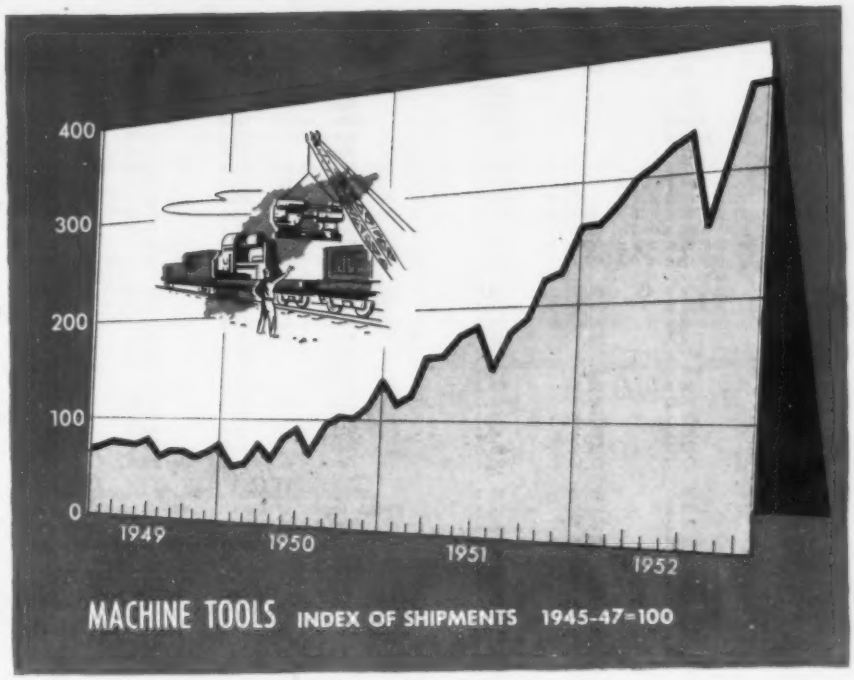
The Iron Age

METAL INDUSTRY FACTS

SECTION 6

PRODUCTION MACHINERY

MACHINE TOOLS • WELDING EQUIPMENT • MOTORS



IN THIS SECTION:

Page

BEARINGS, BALL
Imports 458

BEARINGS, ROLLER
Imports 458

BRAZING
Shops in plants 460

CONSUMPTION OF STEEL
By electrical eqpt. mfrs. 461

CONVEYING EQUIPMENT
Sales index 461

DIVIDENDS, MACHINERY MAKERS 459

EMPLOYMENT
Hours, earnings, rates
Machine tool industry 461
No. of production workers
Machine tool industry 461
Wages and salaries 459

ELECTRICAL EQUIPMENT MAKERS
Steel consumption 461

EXPORTS
Motors, electric 458

FINANCIAL DATA
Machinery manufacturers 459

GEARS
Orders 459

IMPORTS
Bearings, ball and roller 458
Machine tools, by types 462
Machine tools, by country of origin 462

INCOME, MACHINERY MAKERS 459

MACHINE TOOLS
Exports 462
Imports 462
Orders 458
Production 459
Production, by states 458
Shipments 458

MACHINERY MAKERS
Sales 459
Financial data 459

MOTORS, ELECTRIC
Exports 458

ORDERS
Gears 459
Machine tools 458
Welding Equipment 460

PRODUCTION
Machine tools 459

PROFITS, MACHINERY MAKERS 459

SALES
Conveying equipment 461
Machinery Makers 459

SHIPMENTS
Machine tools 458
Welding electrodes 460

SHOPS IN PLANTS
Brazing 460
Gas or arc welding 460
Resistance welding 460

TAXES, MACHINERY MAKERS 459

WELDING
Orders
Arc welding machines 460
Arc welding sets 460
Shipments (electrodes) 460
Shops in plants, no. of 460

6 MACHINERY

Machine tool orders and shipments . . . Ball and roller bearing imports . . . Machine tool shipments by states . . . Motor exports

INDEX OF MACHINE TOOL ORDERS AND SHIPMENTS

Average 1945 to 1947 = 100

		New Orders, Net	Foreign Orders, Net	Shipments 3 Month Average Centered
1945:	Jan.	107.7		128.7
	Feb.	101.6		132.1
	Mar.	160.8		136.3
	Apr.	94.9		141.2
	May	99.3		143.0
	June	72.8		134.0
	July	53.9		124.8
	Aug.	11.5		108.3
	Sept.	51.6	6.4	106.3
	Oct.	64.4	11.3	99.1
	Nov.	79.0	16.7	94.3
	Dec.	112.8	49.8	93.1
1946:	Jan.	115.6	44.3	93.9
	Feb.	79.8	24.0	98.4
	Mar.	100.6	26.8	96.1
	Apr.	123.4	25.3	96.1
	May	107.9	24.1	97.7
	June	109.1	35.7	90.8
	July	99.0	29.3	90.2
	Aug.	99.9	22.4	86.1
	Sept.	86.4	18.3	93.3
	Oct.	85.3	22.1	92.6
	Nov.	73.2	24.5	95.2
	Dec.	72.7	21.8	92.4
1947:	Jan.	71.1	21.0	93.1
	Feb.	63.8	15.8	94.8
	Mar.	74.3	20.1	95.4
	Apr.	69.8	18.8	94.3
	May	76.9	16.3	88.9
	June	90.9	17.2	79.5
	July	81.1	16.7	71.0
	Aug.	62.1	14.6	68.6
	Sept.	63.7	14.7	78.5
	Oct.	81.0	16.0	85.5
	Nov.	75.6	11.5	92.6
	Dec.	81.1	14.8	88.1

		New Orders, Net	Foreign Orders, Net	Shipments 3 Month Average Centered
1948:	Jan.	83.1	14.0	75.3
	Feb.	73.3	12.7	87.1
	Mar.	86.3	16.1	83.6
	Apr.	86.3	14.1	82.0
	May	73.5	11.4	82.6
	June	83.4	11.9	84.4
	July	74.0	13.3	82.4
	Aug.	73.7	13.6	69.8
	Sept.	71.1	11.6	84.7
	Oct.	87.4	14.0	80.4
	Nov.	72.2	18.1	76.2
	Dec.	78.7	16.2	96.9
1949:	Jan.	87.0	21.9	68.8
	Feb.	80.9	26.5	70.3
	Mar.	93.5	22.3	75.8
	Apr.	70.1	23.1	74.7
	May	63.7	15.8	72.6
	June	53.6	15.7	79.0
	July	48.0	14.0	80.7
	Aug.	51.5	18.8	67.3
	Sept.	57.7	13.7	67.6
	Oct.	56.8	13.7	62.3
	Nov.	54.3	17.0	67.6
	Dec.	62.5	22.4	75.7

		New Orders, Net	Foreign Orders, Net	Shipments*
1950:	Jan.	99.7	26.7	92.8
	Feb.	89.2	18.8	96.1
	Mar.	107.4	24.9	78.3
	Apr.	98.9	17.4	81.6
	May	116.4	18.4	82.5
	June	124.1	23.0	91.9
	July	253.1	22.3	98.3
	Aug.	305.1	34.2	96.7
	Sept.	280.8	27.2	101.8
	Oct.	289.6	48.8	100.9
	Nov.	291.9	.....	110.9
	Dec.	410.1	.....	135.7
1951:	Jan.	475.4	61.3	114.3
	Feb.	615.5	78.2	123.8
	Mar.	590.3	102.1	158.9
	Apr.	516.1	66.1	167.7
	May	483.0	35.7	178.1
	June	558.8	56.4	182.8
	July	490.6	54.9	144.7
	Aug.	488.9	58.7	178.9
	Sept.	380.2	27.0	199.8
	Oct.	403.9	41.1	221.3
	Nov.	330.5	29.0	226.0
	Dec.	376.5	18.3	264.7
1952:	Jan.	347.8	33.8	268.6
	Feb.	318.8	14.4	279.6
	Mar.	324.3	23.3	299.5
	Apr.	293.5	18.6	307.9
	May	284.6	31.4	323.0
	June	342.9	20.3	330.8
	July	376.3	14.9	259.7
	Aug.	311.1	22.7	317.0
	Sept.	302.4	23.1	368.4
	Oct.†	243.3	22.5	387.6
	Nov.†	210.1	18.3	338.2

* Beginning January 1949, net shipment index reported, instead of 3-month centered shipment average.
† Preliminary.

Source: National Machine Tool Builders Assn.

Machinery editor, E. C. Beaudet, sums up machine tool high spots of 1952, looks into '53—p. 243.

MACHINE TOOL MANUFACTURE BY STATES

Shipments in Thousands of Dollars

	1946	1947	1948	1949	1950	1951
New England Total	$ 78,043	$133,187	$ 63,446	$ 56,494	$ 90,578	$177,337
Connecticut	28,546	53,044	21,708	21,256	29,055	62,848
Massachusetts	24,582	25,068	19,949	18,090	24,073	61,872
New Hampshire, Rhode Island, and Vermont	24,915	55,075	21,789	17,148	37,450	52,617
Middle Atlantic Total	33,894	53,597	29,736	26,893	30,962	69,773
New Jersey	5,573	11,837	4,299	3,118	3,220	16,277
New York	15,581	29,370	14,573	13,786	16,423	32,898
Pennsylvania	12,760	12,390	10,864	9,989	11,319	20,598
East North Central Total	205,542	298,768	175,325	149,641	183,926	383,592
Michigan	28,256	66,937	22,735	20,593	31,521	70,380
Ohio	109,473	133,662	94,913	81,842	94,293	191,865
Wisconsin	24,924	*	19,532	18,609	24,328	34,508
Illinois and Indiana	42,889	*	38,145	28,597	33,784	66,839
West North Central Total	8,708	12,819	4,641	5,021	6,871	12,056
Minnesota	5,417	4,491	2,444	1,804	3,655	*
Missouri	2,459	*	1,635	2,028	1,820	4,136
Iowa, Kansas, Nebraska, South Dakota	832	*	562	1,189	1,396	*
Pacific States	1,755	*	1,658	915	1,144	3,216
All Others	3,217	*	2,715	2,406	2,262	3,748
U. S. Total	$331,159	$501,882	$277,521	$241,370	$315,743	$629,722

* Breakdown not available.

Source: Dept. of Commerce

ELECTRIC MOTOR EXPORTS

Value in Thousands of Dollars

	Fractional Hp ½ Hp and Under		Fractional Hp Over ½ and Under 1 Hp	
	No.	Value	No.	Value
1940	154,395	1,005	15,225	380
1941	198,735	1,250	28,883	603
1942	132,523	735	18,532	462
1943	69,974	569	8,991	261
1944	65,300	738	15,463	408
1945	75,212	878	24,384	621
1946	156,222	1,306	37,200	1,050
1947	275,255	3,002	80,303	3,079
1948	248,717	3,353	80,739	2,895
1949	204,663	2,372	40,810	1,538
1950	281,976	2,728	32,077	1,120
1951	390,182	4,380	43,186	1,655
1952 (7 Months)	160,432	2,251	27,902	1,309

	Stationary, 1 to 200 Hp		Stationary, Over 200 Hp	
	No.	Value	No.	Value
1940	18,664	2,485	131	585
1941	28,626	2,858	167	1,091
1942	25,712	3,114	73	289
1943	37,138	5,064	235	1,203
1944	40,540	7,514	577	3,636
1945	54,434	9,061	338	1,968
1946	64,871	9,374	439	2,263
1947	108,747	13,479	538	2,848
1948	93,183	15,627	432	3,064
1949	48,041	14,008	811	7,748
1950	28,843	7,887	374	6,840
1951	33,251	9,872	399	4,308
1952 (7 Months)	23,268	8,519	233	4,133

Source: Dept. of Commerce

ROLLER BEARING IMPORTS

Value in Thousands of Dollars

1939	$181	1946	$167
1940	213	1947	67
1941	138	1948	128
1942	28	1949	38
1943	8	1950	117
1944	14	1951	1,244
1945	26	1952 (9 mos.)	1,094

Source: Bureau of Census

BALL BEARING IMPORTS

Value in Thousands of Dollars

1939	$267	1946	$107
1940	145	1947	39
1941	676	1948	55
1942	54	1949	49
1943	20	1950	156
1944	481	1951	1,541
1945	85	1952 (9 mos.)	1,029

Source: Bureau of Census

Machine tool shipments by types . . . Index of gear orders . . . Machinery manufacturers' sales, wages, taxes, profits, dividends

SHIPMENTS OF SELECTED TYPES OF MACHINE TOOLS

By Number and in Thousands of Dollars

	1945		1946		1947		1948		1949		1950		1951	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Horizontal and Vertical Boring Machines	1,901	$29,415	1,886	$27,454	1,444	$25,825	1,268	$24,098	1,212	$29,430	1,383	$29,402	2,518	$75,068
Horizontal Vertical and Radial Drills	11,731	22,784	.....	33,970	.....	33,517	.....	32,816	6,305	25,271	9,817	33,129	19,257	70,916
Gear Cutting Machines	1,295	11,443	1,852	17,820	1,682	17,719	1,367	16,407	1,095	14,231	1,402	19,819	2,452	38,336
Grinding Machines	10,741	43,413	97,799	57,123	.....	56,364	98,792	47,294	64,257	45,660	79,274	60,859	109,782	121,115
Honing and Lapping Machines	.....	.....	.....	.....	.....	.....	.....	.....	154	1,811	290	3,041	618	7,405
Lathes	23,929	93,888	42,927	103,324	.....	92,908	29,322	81,106	18,631	62,289	30,251	89,716	43,107	170,529
Milling Machines	5,799	35,407	9,929	41,155	7,504	35,278	6,064	34,914	4,397	31,400	6,975	36,452	11,287	70,257
Broaching Machines	281	2,222	573	4,657	532	4,956	343	3,779	290	3,411	374	4,883	661	11,975
Planers	226	7,344	206	4,853	152	4,018	157	4,828	99	3,699	84	3,035	111	5,986
Shapers and Slotters	.....	.....	2,110	7,189	1,787	6,880	1,389	5,826	888	2,831	794	3,397	1,096	6,095
Threading Machines	.....	.....	478	1,640	618	2,363	533	2,288	469	3,065	10,827	7,144	12,053	9,561

Source: Department of Commerce and War Production Board

INDEX OF GEAR ORDERS

Average Sales 1935 to 1939 = 100

	January	February	March	April	May	June	July	August	September	October	November	December
1937	150.5	127.8	202.5	167.7	125.6	135.5	129.2	131.3	125.7	148.2	132.9	100.4
1938	96.7	78.9	93.5	72.1	68.3	59.9	68.3	75.3	84.8	72.2	68.8	77.3
1939	87.7	84.3	106.0	86.7	90.7	93.5	89.8	93.7	125.5	133.3	128.6	110.0
1940	126.5	113.4	114.4	128.5	130.9	126.9	132.9	184.4	177.3	198.0	170.1	202.1
1941	251.4	557.1	392.0	263.4	246.1	269.3	282.5	287.1	216.1	240.4	241.0	233.9
1942	298.9	323.4	455.3	376.1	430.4	362.7	348.7	395.8	354.9	228.4	329.9	302.2
1943	326.0	365.6	417.0	257.4	378.9	472.5	424.8	347.8	380.0	390.6	246.9	411.2
1944	252.5	203.3	418.8	247.4	323.4	274.5	221.4	220.6	285.5	279.0	220.3	226.9
1945	299.2	261.8	345.8	300.5	227.7	240.1	203.5	154.6	188.9	240.2	234.3	212.8
1946	265.8	225.4	265.9	290.9	258.8	279.0	382.2	330.9	292.9	245.4	280.9	386.1
1947	317.0	303.0	342.9	346.2	317.2	278.0	278.5	261.6	297.7	317.7	358.9	343.6
1948	346.8	324.4	389.8	320.9	283.6	324.1	348.4	338.6	320.4	333.3	309.0	325.9
1949	320.7	262.3	299.1	339.0	280.1	227.8	193.1	262.0	224.9	242.3	230.7	242.8
1950	280.2	272.9	358.4	328.6	383.1	401.0	410.7	617.4	654.5	564.8	554.9	680.4
1951	764.6	809.1	830.7	742.5	687.1	800.9	589.1	544.2	638.1	703.4	530.0	716.5
1952	670.6	539.5	517.1	478.7	426.3	452.3	453.9	413.9	485.0	533.1	.....	.....
1952	New base (1947-1949=100)	.....	.....	.....	.....	.....	145.3	132.3	143.4	160.8	.....	.....

Source: American Gear Manufacturers Association

MACHINERY MAKERS' SALES

Except Electrical—in Millions

	Sales	Profits,* After Taxes	Profits,* Pct of Sales
1931	$2,295	−$79	−$3.4
1932	1,342	−213	−15.9
1933	1,458	− 45	− 3.1
1934	1,898	85	4.5
1935	2,419	163	6.7
1936	3,358	284	8.5
1937	4,144	354	8.5
1938	3,006	154	5.1
1939	3,463	261	7.5
1940	4,588	448	9.8
1941	7,222	689	9.3
1942	9,437	574	6.1
1943	10,732	484	4.5
1944	11,012	555	5.0
1945	9,801	332	3.4
1946	9,117	378	4.2
1947	13,145	910	6.9
1948	14,994	1,092	7.3
1949	13,421	818	6.1
1950	15,233	1,027	6.7
1951	20,123	1,012	5.0

*Includes inventory profit adjustment in years prior to 1944.

Source: Department of Commerce

FINANCIAL DATA ON MACHINERY MANUFACTURERS

Except Electrical—Millions of Dollars

	Total Income	Wages and Salaries	Interest	Taxes, Incl. Income and Excess Profit	Corporate Profits after Taxes: Total Profit	Dividends	Undistributed Profits	Income of Unincorporated Enterprises
1931	$755	$782	−$23	$13	−$19	$137	−$156	$2
1932	298	496	−21	5	−179	70	−249	−3
1933	478	500	−19	11	−67	47	−114	1
1934	735	685	−18	26	35	81	−46	7
1935	1,021	831	−18	38	158	105	53	12
1936	1,398	1,048	−18	73	275	182	93	20
1937	1,759	1,389	−12	101	258	220	38	23
1938	1,247	1,007	−16	48	196	140	56	14
1939	1,492	1,165	−18	66	258	154	104	19
1940	2,181	1,502	−19	240	426	200	226	32
1941	3,850	2,430	−22	774	811	238	373	87
1942	5,459	3,585	−27	1,078	561	211	363	145
1943	6,037	4,162	−24	1,017	498	188	310	231
1944	6,000	4,180	−17	818	555	189	388	300
1945	5,191	3,900	−14	583	332	182	150	287
1946	4,829	3,987	−23	358	378	230	148	195
1947	6,324	4,821	− 9	630	910	299	611	145
1948	7,115	5,359	−10	732	1,092	355	737	125
1949	6,314	4,653	− 5	587	818	341	477	97
1950	7,409	5,211	− 4	941	1,027	385	642	156
1951	10,033	7,010	− 7	1,742	1,012	385	627	179

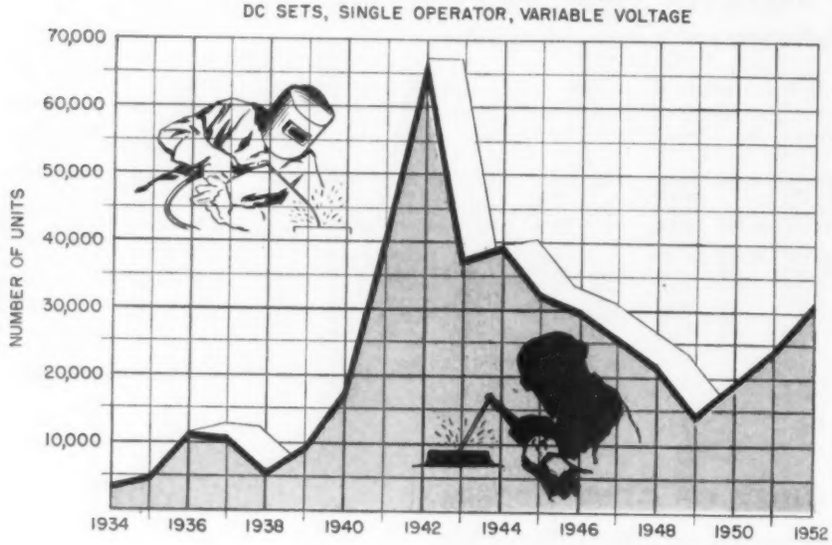
Source: Department of Commerce

6 BRAZING, WELDING

Sales of arcwelding sets . . . Shipments of welding electrodes . . . Number of captive arcwelding and brazing shops in industry.

ARC WELDING MACHINE ORDERS

DC SETS, SINGLE OPERATOR, VARIABLE VOLTAGE



ARCWELDING SET ORDERS

Number of Units, Excluding Exports

Year	Single Operator, Variable Voltage, DC Sets: Motor Drive	Engine Drive	Generators Only	Transformer Welders: Industrial Type	Limited Input Type
1935	4,307	860	.....	.....	.....
1936	8,786	2,068	737	.....	.....
1937	8,162	1,738	1,069	.....	.....
1938	4,014	1,007	904	.....	.....
1939	7,242	1,525	995	.....	.....
1940	13,646	2,649	1,168	2,478	
1941	35,856	4,412	1,415	4,217	
1942	60,264	5,051	2,674	8,236	
1943	30,437	4,747	2,068	4,439	
1944	30,230	6,023	3,140	15,426	
1945	20,716	8,776	2,795	21,448	
1946	16,467	10,622	2,819	21,093	16,949
1947	13,677	10,822	1,169	9,719	13,034
1948	10,927	10,435	385	8,792	13,690
1949	7,393	6,193	258	7,295	12,647
1950	10,115	8,207	272	9,882	18,874
1951	13,048	10,333	485	15,645	16,954
1952: January	1,546	1,119	7	1,527	1,751
February	1,517	933	26	1,471	1,923
March	1,569	784	40	1,642	1,899
April	1,329	1,277	21	1,476	1,941
May	1,872	1,025	5	1,596	2,027
June	1,401	975	13	1,438	1,518
July	1,182	847	35	1,233	1,235
August	2,157	811	24	1,434	1,353
September	1,565	761	26	1,535	1,374
October	1,588	1,059	7	1,156	1,442

Totals Reported to National Electrical Mfrs. Assn.

WELDING ELECTRODE SHIPMENTS

Cut Lengths and Coils—Pounds

Year	Total Electrodes	Mild Steel Electrodes	Alloy Steel Electrodes	Bronze and Copper Base	Aluminum and Aluminum Alloys	Hard-facing	Total Non-ferrous
1941	377,564,483	.....	.....	.....	.....	.....	.....
1942	666,965,595	.....	.....	.....	.....	.....	.....
1943	971,979,787	.....	.....	.....	.....	.....	.....
1944	776,993,101	707,756,964	69,736,137	.....	.....	.....	.....
1945	491,819,155	435,789,217	59,029,938	.....	.....	.....	.....
1946	309,117,564	284,126,356	24,991,208	.....	.....	.....	.....
1947	335,078,645	307,756,469	25,172,362	809,688	285,036	50	2,149,768
1948	401,359,255	369,019,831	30,214,928	717,154	202,736	4,255	2,124,496
1949	298,932,909	273,463,740	24,753,807	572,601	139,804	13,185	1,715,362
1950	397,291,228	322,961,932	49,471,710	390,701	168,029	5,910	1,981,696
1951	480,710,719	413,444,913	65,903,970	518,484	172,610	8,390	1,381,836
1952*	405,215,844	338,453,422	65,604,730	347,455	133,260	6,045	1,157,692

* Ten months.

Totals Reported to National Electrical Mfrs. Assn.

GAS OR ARC WELDING SHOPS

In Plants With Over 20 Workers

Alabama	70	Nebraska	49
Arizona	9	Nevada	1
Arkansas	14	New Hampshire	22
California	818	New Jersey	403
Colorado	52	New Mexico	8
Connecticut	181	New York	821
Delaware	23	North Carolina	64
District of Columbia	9	North Dakota	9
Florida	53	Ohio	1181
Georgia	87	Oklahoma	94
Idaho	5	Oregon	79
Illinois	1012	Pennsylvania	792
Indiana	391	Rhode Island	53
Iowa	152	South Carolina	16
Kansas	78	South Dakota	5
Kentucky	68	Tennessee	92
Louisiana	47	Texas	273
Maine	24	Utah	28
Maryland	102	Vermont	20
Massachusetts	355	Virginia	65
Michigan	857	Washington	112
Minnesota	176	West Virginia	45
Mississippi	20	Wisconsin	377
Missouri	212	Wyoming	2
Montana	7	Total	8380

(Source: THE IRON AGE Basic Marketing Data)

BRAZING DEPARTMENTS

In Plants With Over 20 Workers

Alabama	16	Nebraska	11
Arizona	3	Nevada	
Arkansas	1	New Hampshire	8
California	222	New Jersey	168
Colorado	14	New Mexico	1
Connecticut	89	New York	308
Delaware	2	North Carolina	18
District of Columbia	2	North Dakota	
Florida	15	Ohio	302
Georgia	17	Oklahoma	11
Idaho		Oregon	17
Illinois	336	Pennsylvania	212
Indiana	83	Rhode Island	28
Iowa	35	South Carolina	2
Kansas	18	South Dakota	3
Kentucky	19	Tennessee	18
Louisiana	9	Texas	60
Maine	7	Utah	3
Maryland	34	Vermont	7
Massachusetts	144	Virginia	14
Michigan	247	Washington	30
Minnesota	35	West Virginia	9
Mississippi	5	Wisconsin	99
Missouri	55	Wyoming	1
Montana	1	Total	2730

(Source: THE IRON AGE Basic Marketing Data)

RESISTANCE WELDING SHOPS

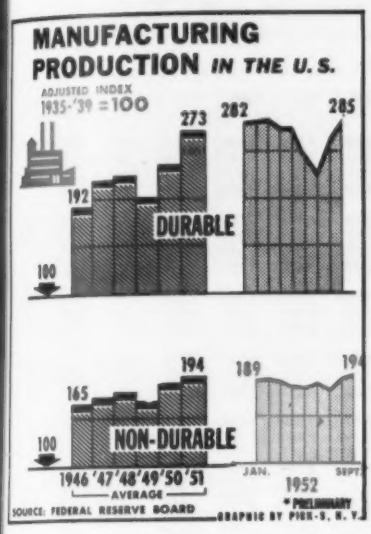
In Plants With Over 20 Workers

Alabama	43	Nebraska	39
Arizona	8	Nevada	1
Arkansas	11	New Hampshire	18
California	501	New Jersey	324
Colorado	23	New Mexico	
Connecticut	178	New York	622
Delaware	10	North Carolina	31
District of Columbia	4	North Dakota	
Florida	25	Ohio	799
Georgia	54	Oklahoma	37
Idaho	2	Oregon	39
Illinois	834	Pennsylvania	492
Indiana	320	Rhode Island	30
Iowa	106	South Carolina	7
Kansas	37	South Dakota	3
Kentucky	52	Tennessee	54
Louisiana	19	Texas	136
Maine	12	Utah	12
Maryland	73	Vermont	11
Massachusetts	265	Virginia	34
Michigan	599	Washington	54
Minnesota	116	West Virginia	30
Mississippi	5	Wisconsin	274
Missouri	184	Wyoming	
Montana	3	Total	6831

(Source: THE IRON AGE Basic Marketing Data)

Machine tool labor, hours and earnings . . . Use of steel products by electrical equipment makers . . . Conveying equipment index.

6 MACHINERY



STEEL USED BY ELECTRICAL EQUIPMENT MAKERS

Mill Shipments—Net Tons

Item	1947	1948	1949	1950	1951	1952 9 Months
Ingots, blooms, billets, slabs, sheet bars, and seamless tube rounds	38,423	11,451	3,537	2,482	4,200	891
Wire rods	27,086	15,784	7,040	10,861	8,702	8,111
Structural shapes	43,223	27,211	18,892	20,714	28,670	18,999
Plates (sheared and universal)	145,720	106,677	128,880	142,606	153,317	102,490
Bars:						
Hot-rolled	103,346	109,706	74,741	111,440	133,473	88,449
Cold-finished	44,341	38,452	24,450	41,021	35,092	20,050
Tool steel	342	257	128	133	954	304
Pipe and tubes:						
Butt weld	115,468					
Lap weld	13,132	138,827	127,995	181,748	226,236	140,831
Electric weld	2,103					
Seamless	1,393					
Conduit	34,367	48,949	32,887			
Mechanical and pressure tubing	5,577	8,373	7,329	11,429	13,280	13,096
Wire:						
Drawn	56,643	57,129	62,254	78,443	88,199	44,964
Nails and staples	429	847	538	587	447	334
Black plate, ordinary	1,781	4,277	2,984	8,207	6,349	3,946
Tin and terneplate:						
Hot dip	1,033	1,030	1,429	3,691	1,450	1,312
Electrolytic	1,544	1,017	303	889	1,051	1,080
Hot-rolled sheets	245,313	230,652	134,111	173,724	203,606	100,589
Cold-rolled sheets	122,030	139,197	90,536	160,954	235,060	116,330
Coated sheets	31,453	24,856	19,101	33,525	33,689	20,357
Electrical sheets and strip	436,614	450,893	342,528	582,995	629,912	330,953
Enameling sheets	2,744	3,606	1,342	5,174	4,049	2,381
Hot-rolled strip	78,885	81,159	54,235	76,252	78,813	40,031
Cold-rolled strip	42,530	94,118	69,085	189,768	134,343	89,433
Total—steel products	1,595,520	1,594,544	1,209,027	1,836,632	2,020,892	1,124,931

Source: American Iron & Steel Institute

MACHINE TOOL LABOR

Workers in Machine Tool Industry

Production and Related Workers

Year	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	$61.57	42.2	$1.459
1949	59.15	39.3	1.505
1950	69.72	43.1	1.614
1951	84.75	47.4	1.788
1952:			
Jan.	90.59	48.6	1.864
Feb.	89.39	47.7	1.874
Mar.	89.77	47.6	1.886
Apr.	88.09	46.9	1.878
May	88.45	46.9	1.886
June	88.26	46.6	1.894
July	84.58	45.3	1.867
Aug.	88.83	46.8	1.898

Source: Bureau of Labor Statistics

An indexed list of manufacturing associations and technical societies in the metalworking industry begins in Section 7, on p. 273. For ready reference in selecting tool steels, don't miss the twenty-fourth edition of The Iron Age "Directory of Tool Steels and Carbides," beginning on p. 308. Coming meetings are on p. 477. Interested in the business outlook for '53? See p. 274.

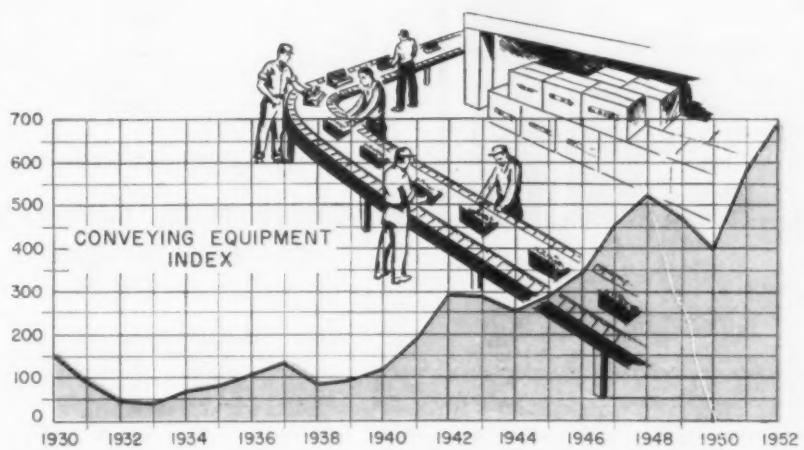
CONVEYING EQUIPMENT INDEX

Average Sales 1935 to 1938 = 100

Year	Index	Year	Index
1929	191	1941	186
1930	154	1942	287
1931	84	1943	282
1932	47	1944	255
1933	44	1945	288
1934	64	1946	348
1935	77	1947	458
1936	104	1948	522
1937	133	1949	469
1938	88	1950	409
1939	96	1951	577
1940	114	1952*	686

* Nine months.

Source: Conveyor Equipment Mfrs. Assn.



6 MACHINE TOOLS

Dollar volume of U. S. machine tool exports by type of machine . . . Imports by country of origin and by type . . .

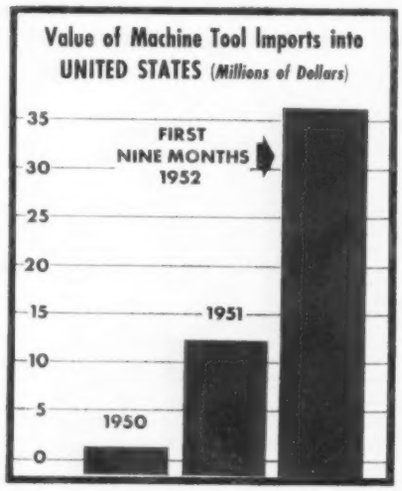
MACHINE TOOL EXPORTS

By Types—In Thousands of Dollars

	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952*
Engine Lathes Including Tool Room	2,825	3,649	6,644	6,534	16,025	13,094	12,939	23,056	19,377	7,918	8,872	7,707	8,335	6,603	3,694	5,221	3,187
Bench Lathes										764	1,423	2,332	1,269	1,119	642	6,269	
Turret Lathes Including Vertical	1,647	3,839	5,986	7,486	17,844	18,162	21,824	33,997	10,829	2,576	2,793	2,824	811	1,977	1,988	2,642	1,881
Ram and Saddle Type Turret Lathes										1,893	4,070	3,686	2,299	1,879	2,012	1,350	
Automatic Chucking and Between-Centers Lathes								10,407	5,821	2,112	5,377	6,798	1,745	3,700	5,438	5,899	5,538
Polishing and Buffing Machines						11,180	11,649	1,966	1,077	1,229	2,113	2,943	1,272	1,040	598	484	190
Other Lathes	1,337	1,420	2,166	3,399	14,138			6,910	9,469	3,062	6,171	5,661	2,612	1,241	423		
Vertical Boring and Turning Mills						10,139	7,495	4,445	7,858	5,820	2,970	2,459	1,727	2,201	2,485	1,367	
Other Boring Machines Including Precision	1,801	2,362	3,628	5,248	10,112			5,607	6,040	4,680	3,309	3,110	1,727	2,176	2,457	2,183	3,971
Tapping and Threading Machines								4,650	1,062	912	1,375	1,519	1,566	2,809	2,264	2,337	1,234
Automatic Screw Machines, Bar	2,236	3,759	4,392	5,605	20,036	17,657	16,137	17,579	15,706	783	2,258	3,288	2,905	5,372	3,956	5,364	
Knee and Column Type Milling Machines	1,168	3,599	4,629	6,689	15,191	19,668	17,326	13,921	2,990	2,533	7,618	4,813	2,701	3,925	2,958	2,158	3,768
Other Milling Machines	2,458	3,639	9,955	12,563	23,831	27,965	18,751	24,499	14,547	5,376	10,868	8,569	5,487	4,175	5,170	5,539	6,452
Gear Cutting Machines	2,126	2,606	3,106	3,988	7,681	3,985	1,765	6,024	4,379	3,225	3,633	6,221	4,976	4,741	5,381	5,118	5,176
Sensitive Drilling Machines, Except Bench						3,890	2,824	1,911	677	1,129	1,065	1,539	1,098	1,010	627	493	372
Radial Drilling Machines	226	806	864	977	3,026	1,562	1,557	3,587	2,998	3,002	3,766	2,404	1,107	964	941	482	301
Other Drilling Machines	2,321	2,527	2,824	3,147	10,245	6,987	5,669	6,211	1,646	1,299	2,557	3,313	1,346	1,672	2,439	1,843	1,254
Planers	449	1,050	2,794	4,020	5,969	1,924	4,246	2,190	8,891	6,235	4,489	2,511	1,609	1,788	1,296	963	399
Shapers						2,489	3,298	3,243	1,731	1,713	3,162	2,109	1,183	934	557	875	549
Surface Grinders	1,081	1,746	2,769	2,559	5,600	5,450	5,587	5,429	4,218	1,859	3,468	3,482	2,003	2,543	1,962	2,226	2,144
External Grinders	1,039	1,568	4,082	3,983	7,138	5,824	3,660	9,214	5,682	2,810	3,412	3,183	1,217	3,590	3,605	3,293	5,326
Internal Grinders	1,259	2,481	3,990	4,218	8,294	3,294	3,000	5,614	2,934	1,554	1,972	2,673	1,195	2,380	1,871	2,241	4,263
Tool and Cutter, and Universal Cylindrical Grinders	1,552	2,002	3,267	3,891	7,927	5,999	5,475	7,998	7,167	2,409	3,281	3,865	2,059	2,295	2,032	1,479	1,709
Gear Tooth Grinders								989	1,725	783	2,090	1,923	1,339	1,130	1,057	1,914	
Honing and Lapping Machines								1,435	668	185	1,658	493	151	273	134	139	341
Thread Grinding Machines								3,528	3,631	558	525	745	427	901	995	1,926	1,925
Other Grinding Machines	1,088	1,623	3,417	5,478	12,494	7,586	14,332	15,251	6,969	331	462	346	137	335	447	207	126
Horizontal Boring Drilling and Milling Machines								6,602	10,970	4,095	3,870	4,655	3,339	2,247	1,523	1,525	1,364
Other Gear Honing and Finishing Machines										4,105	7,010	2,878	2,426	3,689	3,317	2,432	1,708
Broaching Machines										335	1,072	1,263	918	397	853	1,424	974
All Other Machine Tools								2,137	1,073	377	527	1,338	554	1,288	1,027	1,239	798
								4,718	3,423	2,845	2,799	4,482	3,256	2,189	1,755	1,819	167
Total	24,854	38,445	64,516	79,767	185,554	166,533	157,534	237,122	163,599	78,487	110,036	105,328	62,808	72,621	68,493	72,552	54,004

*Seven Months

Source: Dept. of Commerce



MACHINE TOOL IMPORTS

By Principal Countries of Origin

	W. Germany	Italy	Switzerland	United Kingdom	Canada	France
1952:						
January	$ 712,313	$ 993,003	$ 650,368	$ 339,535	$ 327,679	$344,976
February	1,016,748	1,049,544	647,348	374,296	409,771	308,736
March	1,376,368	898,283	509,237	430,808	415,146	456,716
April	1,029,036	928,675	937,250	372,802	468,608	478,484
May	1,252,137	848,845	464,594	424,793	550,741	317,655
June	1,394,767	853,302	620,305	467,512	389,483	401,874
July	1,192,711	872,044	538,373	491,488	227,143	454,705
August	1,571,189	737,633	562,933	447,370	271,810	215,150
September	1,204,516	388,717	319,010	280,754	549,681	507,084
1951	$2,366,702	$1,621,466	$4,312,170	$1,047,306	$1,595,697	$751,012
1950	$ 197,075	$ 4,000	$1,236,335	$ 441,221	$ 231,917	$ 24,973

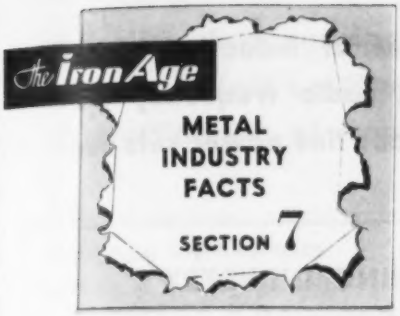
Source: Department of Commerce

MACHINE TOOL IMPORTS

Dollar Volume, by Types

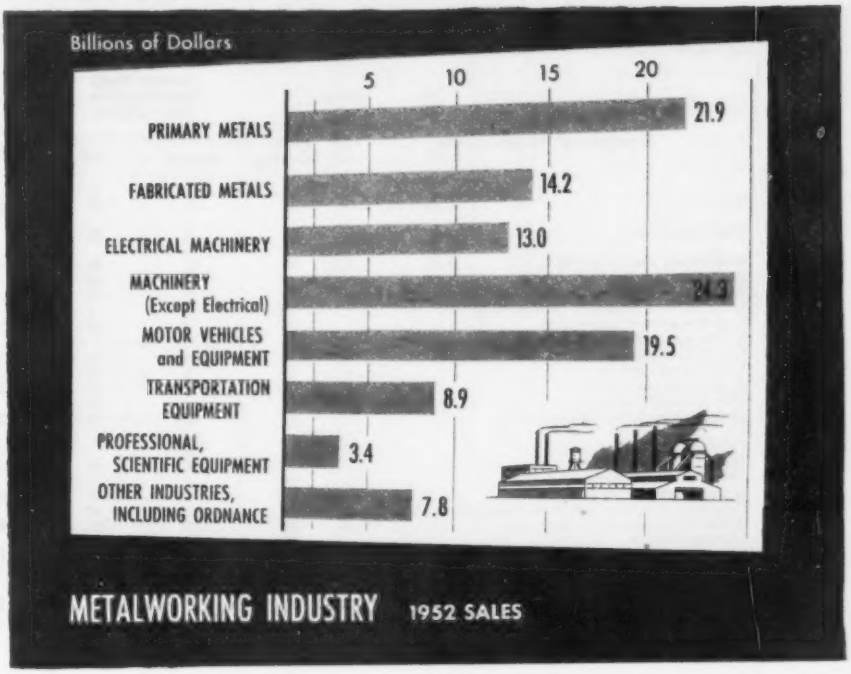
Type	1950	1951	1952 January	February	March	April	May	June	July	August	September
Gear Cutting Machines	$ 42,871	$ 346,633	$ 23,516	$ 24,400	$ 35,024	$ 32,756	$ 37,679	$ 30,683	$ 47,535	$ 23,352	$ 36,838
Punches, Shears, Bar Cutters	56,230	216,339	23,773	19,328	25,711	10,726	36,035	15,442	6,070	18,499	13,350
Machine Tools, Jig Boring	528,252	987,486	111,650	228,136	120,235	203,004	191,906	201,556	74,652	174,969	64,295
Grinding Machines and Lathes	587,544	7,017,736	2,671,534	2,834,128	3,373,618	3,228,962	3,027,522	3,453,453	2,784,649	3,271,981	2,367,432
Metalworking Machines and Parts (not elsewhere specified)	1,076,145	5,135,461	920,069	1,058,212	966,184	1,145,900	994,907	891,596	1,288,271	820,429	950,108
	$2,291,042	$13,703,655	$3,750,542	$4,164,204	$4,520,772	$4,621,348	$4,288,049	$4,592,930	$4,201,177	$4,309,230	$3,432,023

Source: Dept. of Commerce



MARKET STATISTICS

BUSINESS INDEXES • SURVEYS • TRADE GROUPS



IN THIS SECTION:

Page

ASSOCIATIONS
- Addresses 474, 475, 476
- Index of 470, 471, 472, 473

BUFFING DEPTS. IN PLANTS 468

CALENDAR OF EVENTS 477, 478

CLEANERS, METAL, USE BY TYPE 467

CLEANING, METAL IN PLANTS 468

DEGREASING, METAL—IN PLANTS 468

ELECTROPLATING DEPTS. IN PLANTS 468

GALVANIZING DEPTS. IN PLANTS 468

INDEXES
- Carloadings 469
- Construction Contracts 469
- Consumer Goods 469
- Department Store Sales 469
- Employment and Payrolls 469
- Industrial Productions (FRB) 469
- Wholesale Prices 469

INDUCTION HEATING
- Applications 465
- Uses in 1456 Plants 464
- Work Handling Equipment 465

LACQUERING, IN PLANTS 468

MANUFACTURERS' ASSOCIATIONS 470

Page

MEETINGS, COMING 477, 478

METAL POWDER PARTS, INDUSTRY USE 465

METALWORKING INDUSTRY
- Use of Induction Heating 464
- Metal Cleaners 467
- Metal Powder Parts 465
- Rust Preventives 466
- Wire Rope 467

PAINTING SHOPS—IN PLANTS 468

PICKLING, METAL—IN PLANTS 468

POLISHING METAL—IN PLANTS 468

RUST PREVENTIVES, METALWORKING'S USE OF 466

SAND BLASTING, IN PLANTS 468

Page

SHOPS IN PLANTS, NO. OF
- Buffing 468
- Cleaning 468
- Degreasing 468
- Finishing 468
- Galvanizing 468
- Lacquering 468
- Painting 468
- Pickling 468
- Polishing 468
- Sand Blasting 468
- Testing, physical 468
- Tinning 468
- Washing 468

TECHNICAL SOCIETIES 470

TESTING, PHYSICAL—IN PLANTS 468

TINNING—IN PLANTS 468

TRADE ASSOCIATIONS 470

WASHING, METAL—IN PLANTS 468

WIRE ROPE, USE BY INDUSTRIES 467

7 MARKET DATA

Number and types of induction heating units: Spark gap, radio frequency tube, motor generator and line power sets used.

INDUCTION HEATING IN THE METALWORKING INDUSTRY

Analysis of Induction Heating Usage in 1456 Plants by Types and Number of Units Employed

Govt. Ind. Code	Description of Industry Groups	Number Plants Reporting	Number Plants Using Induction Heating Units		Number Sets In Use	Type Induction Heating Sets In Use			
			Number	Pct		Spark Gap	Radio Frequency Tube	Motor Generator	60 Cycle Line Power
19	Ordnance	11	10	91	26	10	11	5	.....
25	Metal Furniture	31	7	23	7	1	5	.....	1
3312	Steel Works and Rolling Mills	48	11	23	40	7	4	29	.....
3313	Electrometallurgical Products	5	1	20	3	2	.....	1	.....
3321	Gray Iron Foundries (independent)	39	2	5	4	.....	3	1	.....
3322	Malleable Iron Foundries (independent)	12	1	8	2	.....	2	.....	.....
3323	Steel Foundries (independent)	23	7	30	16	1	1	14	.....
333	Nonferrous Smelting and Refining	11	0	.....	.....	.....	.....	.....	.....
335	Nonferrous Rolling Mills	15	4	27	27	2	.....	1	24
336	Nonferrous Foundries	48	9	19	27	4	2	3	18
3391	Forge Shops (detached)	62	8	13	37	1	6	30	.....
3392	Wire Drawing (detached)	7	1	14	1	.....	.....	.....	1
3395	Heat Treating Shops (independent)	27	18	66	38	13	20	5	.....
341	Tin Cans	10	0	.....	.....	.....	.....	.....	.....
342	Hand Tools and Hardware	46	13	28	20	5	11	4	.....
3431-32	Plumbers' Supplies and Oil Burners	16	0	.....	.....	.....	.....	.....	.....
3439	Cooking and Heating Apparatus	54	9	17	43	6	4	7	26
344	Fabricated Structural and Plate Products	71	7	10	8	.....	.....	7	1
346	Metal Stampings	49	13	26	41	4	15	21	1
347	Lighting Fixtures	11	0	.....	.....	.....	.....	.....	.....
348	Wire Springs and Wirework	36	5	14	11	1	7	.....	3
3491	Metal Shipping Containers	5	1	20	8	.....	.....	8	.....
3493	Leaf and Hot-wound Springs	3	1	33	1	.....	.....	1	.....
3494	Bolts, Nuts and Rivets	28	5	18	11	3	.....	8	.....
3495	Screw Machine Products	7	3	43	7	.....	6	1	.....
3497	Foil	3	1	33	1	.....	.....	1	.....
3499	Miscellaneous Fabricated Products	3	1	33	5	2	3	.....	.....
351	Engines, Except Auto and Aircraft	17	11	65	25	7	10	6	2
352	Farm Machinery and Tractors	39	16	41	105	8	20	77	.....
353	Construction, Mining and Oil-field Equipment	60	12	20	22	3	5	14	.....
354	Metalworking Machinery and Tools	98	34	35	59	13	35	11	.....
3551	Food Machinery	11	0	.....	.....	.....	.....	.....	.....
3552	Textile Machinery	13	4	31	11	2	6	3	.....
3553	Woodworking Machinery	4	0	.....	.....	.....	.....	.....	.....
3554	Paper and Pulp Machinery	6	0	.....	.....	.....	.....	.....	.....
3555	Printing Machinery	5	1	20	1	.....	1	.....	.....
3559	Other Special-Industry Machinery	20	7	35	17	6	7	1	3
3561	Pumps and Compressors	12	2	17	2	.....	1	1	.....
3562	Elevators	3	0	.....	.....	.....	.....	.....	.....
3563	Conveyers and Hoists	9	2	22	*1	*	*	*1	*
3565	Industrial Trucks	10	1	10	*	*	*	*	*
3566	Mechanical Power Transmission Equipment	15	5	33	7	1	4	2	.....
3567	Industrial Furnaces	4	0	.....	.....	.....	.....	.....	.....
3568	Stokers	4	1	25	1	.....	.....	1	.....
3569	Other General Industrial Equipment	9	1	11	1	.....	1	.....	.....
357	Office and Store Machines	18	7	39	13	10	3	.....	.....
358	Household Machines	38	14	37	48	4	32	6	6
3591	Valves and Fittings	19	6	31	26	3	13	10	.....
3592	Fabricated Piping	2	0	.....	.....	.....	.....	.....	.....
3593	Ball and Roller Bearings	11	4	36	7	2	2	3	.....
3599	Machine Shops	8	2	25	*1	*	*	*1	*
361	Electric Motors, Controls, Wiring Devices	55	25	45	70	24	30	11	5
362	Electric Appliances, not elsewhere classified	9	4	44	7	1	3	3	.....
363	Insulated Wire and Cable	8	2	25	3	.....	3	.....	.....
364	Electric Equipment for Vehicles	9	4	44	21	11	5	5	.....
365	Electric Lamp Bulbs	2	1	50	1	.....	1	.....	.....
3661	Radio and Television	24	9	38	45	6	39	.....	.....
3662	Radio Tubes	5	4	80	63	.....	48	.....	15
3664-69	Other Communication Equipment	4	2	50	2	1	1	.....	.....
369	Miscellaneous Electric Products	9	3	33	11	1	10	.....	.....
371	Motor Vehicles and Parts	101	37	37	149	17	60	72	.....
372	Aircraft and Parts	12	9	75	12	3	5	4	.....
373	Shipbuilding	11	6	54	26	.....	1	6	19
3741	Locomotives	3	3	100	7	.....	.....	7	.....
3742	Railroad Cars	9	1	11	2	1	.....	1	.....
375	Motorcycles and Bicycles	2	1	50	3	1	.....	2	.....
381-2-3	Engineering and Mechanical Instruments	17	9	53	19	6	11	2	.....
384	Surgical and Dental Instruments	6	1	17	6	1	5	.....	.....
385-6	Eyeglasses, Photo Equipment	4	0	.....	.....	.....	.....	.....	.....
387	Clocks, Watches and Cases	6	2	33	2	1	1	.....	.....
391	Jewelry and Silverware	8	4	50	11	2	8	1	.....
394	Toys and Sporting Goods	12	2	17	6	4	1	1	.....
395	Mechanical Pencils, Hand Stamps	6	2	33	5	2	3	.....	.....
3964	Needles, Slide and Snap Fasteners	7	2	28	2	1	1	.....	.....
398-99	Miscellaneous Metal Products	12	4	33	10	.....	7	3	.....
	Total	1,457	405	28%	1,214	204	483	401	126

* Number of sets not reported.

Induction heating applications in 405 plants . . . Work handling equipment data. Production use of metal powder parts.

PRODUCT DATA 7

INDUCTION HEATING USES

Breakdown of Uses in 405 Plants

Application	No. Plants	Pct
Brazing or Soldering	242	60
Melting	50	12
Forging or Forming	59	15
Annealing	132	33
Surface Hardening	162	40
Heat Treating (through hardening)	134	33

WORK HANDLING EQUIPMENT

For Induction Heating Operations

Prefer to Buy or Build Equipment	No. Plants Reporting	Pct
Buy	152	43.3
Build	187	53.3
Buy and Build	12	3.4

THE IRON AGE PRODUCT SURVEYS

The product survey data published on this and the following pages were compiled by the market research division of THE IRON AGE. They were selected for publication here from among a number of such surveys on the basis of general reader interest. Additional data on these product surveys may be obtained from the market research division.

Sources of data for the surveys were representative metalworking companies. Where quantities reported in a sample were expanded to yield an industry estimate, expansion factors were used for the various industry groups. The factors were arrived at by dividing the number of production workers in the industry by the number of production workers in reporting plants. In cases where the sample was not considered large enough, no effort has been made to project an industry total on the basis of the sample. Data on metal cleaning, finishing and testing, etc., in this issue is from the revised IRON AGE Basic Marketing Data.

USES OF INDUCTION HEATING UNITS BY TYPE

Applications Based on Operations Performed by 1,214 Sets in 405 Plants

Application	Total Sets		Spark Gap	Radio Frequency Tube	Motor Generator	Line Power
	Number	Pct	No. Sets	No. Sets	No. Sets	No. Sets
Heat Treating (through hardening)	189	15	48	76	65	.....
Surface Hardening	186	15	15	78	93	.....
Annealing	89	7	9	32	34	14
Carburizing	9	.....	6	.....	3	.....
Melting	139	11	13	3	39	84
Forging	82	7	3	8	71	.....
Forming	18	1	2	4	12	.....
Brazing	210	17	50	101	59	.....
Soldering	134	11	45	76	12	1
Experimental Work	10	.....	4	4	2	.....
Aluminum Extrusions	9	.....	.....	4	.....	5
Preheating	9	.....	.....	1	4	4
Shrink Fits	7	.....	.....	1	3	3
Expansion Assembling Ball Bearings	3	.....	.....	2	1	.....
Radio Tube Processing	64	5	.....	49	.....	15
Lens Block Heating	5	.....	.....	3	2	.....
Reclaim Metal Rubber Bonded Parts	2	.....	1	1	.....	.....
Sweating	1	.....	.....	.....	1	.....
Carbon Determination	1	.....	.....	1	.....	.....
Core Baking	10	1	.....	10	.....	.....
Plastics	6	.....	.....	6	.....	.....
Curing	4	.....	.....	4	.....	.....
Drying Glue on Wood	1	.....	.....	1	.....	.....
Dielectric Preheating	1	.....	.....	1	.....	.....
Glass Melting	1	.....	.....	1	.....	.....
Application Not Given	24	2	8	16	.....	.....
Total Sets	1,214 Sets	.....	204 Sets	483 Sets	401 Sets	126 Sets

METAL POWDER PARTS FOR PRODUCTION USE

Estimate of Metalworking Industry Use in 1951, from an Iron Age Survey

Govt. Ind. Code	Description of Industry Groups	Powder Parts, Cost
19	Ordnance Equipment	$ 264,515
25	Metal Furniture	78,006
3422	Edge & Hand Tools	45,737
3429	Hardware	2,111,671
3431	Plumbers' Fittings & Supplies	227,317
3432-9	Heating & Cooking Apparatus	1,302,791
3442	Metal Doors, Sash, Moldings	80,607
3492	Safes & Vaults	6,592
351	Engines (Except Auto & Aircraft)	94,594
352	Agricultural Machinery & Tractors	1,505,896
353	Construction & Mining Machinery	956,321
3541	Machine Tools	754,774
3542	Other Metalworking Machinery	259,185
3543	Machine Tool Accessories, Gages, etc.	9,526
3551	Food Machinery	44,020
3552	Textile Machinery	184,316
3553	Woodworking Machinery	61,419
3554	Paper Mill Machinery	22,205
3555	Printing Machinery	36,630
3559	Other Special-Industry Machinery	198,670
3561	Pumps & Compressors (Not Auto)	221,208
3563	Conveyors, Cranes, Hoists	94,330
3564	Blowers & Ventilating Fans	68,306
3565	Industrial Trucks	42,903
3566	Mechanical Power Transmission Equipment	249,935
3569	Other General Industrial Machinery	78,820
357	Office & Store Machines	663,552
3581	Domestic Laundry Equipment	484,154
3583	Sewing Machines	104,431
3584	Vacuum Cleaners	425,737
3585	Refrigerators, Air Conditioning Equipment	648,565
3589	Other Service & Household Machines	52,249
3591	Valves	75,875
3611	Electric Wiring Devices	119,956
3614	Electric Motors & Generators	3,523,379
3616	Switchgear & Electric Controls	748,594
3617	Electric Welding Apparatus	19,920
3641	Electrical Equipment for Vehicles	211,269
3661	Radio, Television & Related Electronics	11,076,533
3664	Telephone Equipment	1,516,572
3693	X-Ray & Therapeutic Equipment	21,607
3699	Miscellaneous Electrical Products	53,943
371	Motor Vehicles, Parts & Accessories	8,503,909
372	Aircraft & Aircraft Sub-Assemblies	634,586
3799	Miscellaneous Transportation Equipment	97,178
382	Mechanical Measuring & Control Instruments	662,715
384	Surgical & Dental Equipment	5,739
3871	Clocks & Clock-Operated Devices	11,675
3941	Toys, Game Sets, etc.	19,690
3943	Childrens' Vehicles	180,510
	Total	$38,858,632

7 MARKET DATA

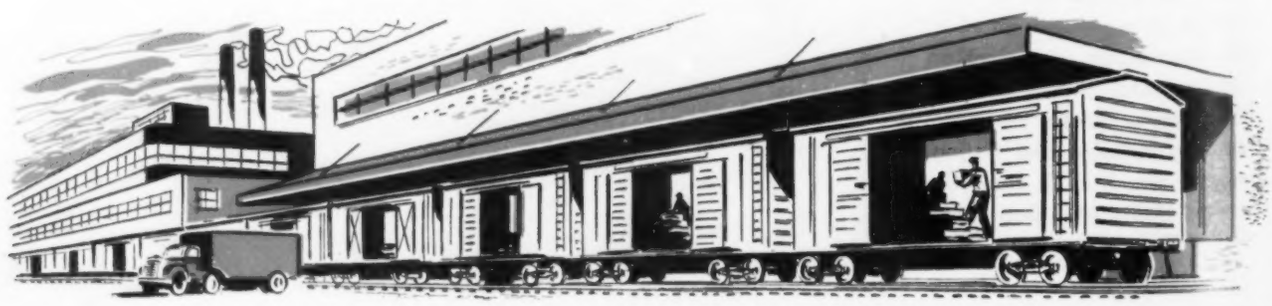
Removable coatings or oils, aluminum foil and vapor wrappings for corrosion protection of metals in process or in shipment.

REMOVABLE RUST PREVENTIVES IN METALWORKING

Estimated Consumption for 1951 by Sub-Groups Based on Expansion of Sample of Reports from 956 Plants*

Govt. Ind. Code	Description of Industry Groups	Removable Coatings or Oils		Vapor Wrappers		Aluminum Foil	
		Gal.	Value	Lb	Value	Lb	Value
19	Ordnance	54,900	$ 109,464	50,600	$ 44,100	6,600	$ 6,600
25	Metal Furniture	34,181	57,670	9,900	1,122		
3312	Steel Works and Rolling Mills	3,629,190	1,069,278	2,570,400	535,108		
335	Nonferrous Rolling Mills	18,232	4,257				
3392	Wire Drawing, Cold Rolling	356,427	202,289	14,040	2,268		
341	Tin Cans	18,720	9,360	1,680	252		
342	Cutlery, Hand Tools, Hardware	158,612	154,067	215,460	39,200	1,520	1,900
343	Cooking and Heating Equipment	36,569	36,023	91,640	15,080	580	725
3442	Metal Doors, Sash, Moldings	1,810	2,142				
3443	Boilers, Pressure Vessels	51,005	72,124	83,830	14,140		
3444	Sheet Metal Work	16,172	22,483	21,140	3,020		
3463	Stampings	124,971	127,561	281,268	45,622		
347	Lighting Fixtures	26,730	9,416				
348	Wirework and Wire Springs	229,182	124,154	137,060	23,870		
3492	Safes and Vaults	1,430	1,579	1,650	330		
3494	Bolts, Nuts, Screw Products	76,398	54,953				
351	Engines (except auto and aircraft)	10,842	18,006	117,000	43,290		
3522	Farm Machinery	85,663	82,926	4,250	552		
3531	Construction and Mining Machinery	19,458	32,816	102,810	62,307		
3532	Oil-Field Machinery and Tools	40,729	56,098	54,495	18,711		
3541	Machine Tools	80,325	73,440	50,235	17,850	1,530	1,785
3542	Metalworking Machinery	29,344	42,812	73,535	27,804	577	770
3543	Cutting Tools, Precision Tools	45,864	54,145	20,930	10,010		
3551	Food Machinery	18,445	32,682	102,000	24,437		
3552	Textile Machinery	48,997	42,778	124,372	47,868		
3553	Woodworking Machinery	2,520	3,654				
3554	Paper Mill Machinery	16,020	17,114	65,880	22,860		
3555	Printing Machinery	3,841	4,434	35,880	27,554		
3559	Special-Industry Machinery	10,824	13,299	14,685	6,006	2,541	3,300
356	General Industrial Machinery	40,925	40,920	35,050	12,770	500	660
3566	Mechanical Power Transmission Products	142,300	128,420	6,000	1,050		
357	Office and Store Machines	84,775	58,211	101,680	45,415	1,240	1,317
358	Household and Service Machines	75,175	85,263	109,610	38,703	1,940	2,425
3591	Valves	44,744	42,330	5,355	1,122		
3593	Ball and Roller Bearings	339,000	298,990	260,000	93,500	290,250	290,250
3599	Machine Parts	26,250	37,650	36,000	10,125	8,000	8,000
361	Electric Motors, Controls, Wiring Devices	118,530	99,279	36,000	16,380	37,200	37,200
362	Electric Appliances (not elsewhere classified)	13,176	12,564	34,000	15,300	1,500	1,500
364	Electric Equipment for Vehicles	23,000	23,000	920	253	300	400
366	Communication Equipment	104,715	91,350	2,700	990	600	704
3699	Electric Products, Miscellaneous	10,500	12,000				
371	Motor Vehicles and Parts	1,146,717	949,351	377,000	165,945	12,000	12,000
372	Aircraft	*N.A.	*N.A.	*N.A.	*N.A.	*N.A.	*N.A.
3742	Railway Cars	60,105	69,296				
3751	Bicycles	3,344	5,104				
38	Instruments, Engineering and Medical	39,123	41,148	58,320	29,205	1,750	1,330
39	Silver and Miscellaneous Metal Products	21,972	31,308	180	45		
	Total	7,541,752	$4,579,208	5,317,555	$1,464,164	388,628	$370,866

* Aircraft industry omitted because of insufficient data.



Wire rope consumption by industry groups. Use of emulsion, alkali and phosphating cleaners, vapor solvents, shot and grit.

7 MARKET DATA

WIRE ROPE CONSUMPTION

1951 Estimate by Industry Sub-Groups*

Govt. Ind. Code	Description of Industry Groups	Wire Rope Purchased in 1951 (lb)
19	Ordnance	140,097
25	Metal Furniture	56,921
331	Blast Furnaces and Steel Works	24,210,824
332	Iron and Steel Foundries	903,576
333	Nonferrous Smelting	1,658,029
335	Nonferrous Rolling, Extruding, etc.	623,875
336	Nonferrous Foundries	32,407
3391	Iron and Steel Forgings	273,848
3392	Wire Drawing (Independents)	25,440
3393	Welded and Riveted Pipe	83,252
3 Bal.	Balance of Primary Metals	7,320
341	Tin Cans	188,684
342	Hand Tools and Hardware	290,212
343	Stoves, Heating Equipment, Sinks	227,815
3441	Structural Steel Fabricators	966,490
3442	Metal Doors, Sash, Mouldings	180,160
3443	Pressure Vessels, Boilers	510,972
3444	Sheet Metal Work	75,335
346	Stampings	172,484
347	Lighting Fixtures	1,235
348	Wirework and Wire Springs	117,317
349	Miscellaneous Fabricated Products	68,990
351	Engines (except auto and aircraft)	40,600
3521	Tractors	98,800
3522	Farm Machinery	1,618,339
3531	Construction and Mining Machinery	20,131,000
3532	Oil Field Machinery and Tools	2,263,774
3541	Machine Tools	84,439
3542	Other Metalworking Machinery	402,304
3543	Cutting Tools, Dies, Inspection Tools	3,982
3551	Food Machinery	6,631
3552	Textile Machinery	148,006
3553	Woodworking and Sawmill Machinery	195,097
3554	Paper Mill Machinery	60,927
3555	Printing Machinery	17,661
3556	Foundry Machinery	9,375
3559	Other Special-Industry Machinery	152,300
3561	Pumps and Compressors	146,797
3562	Elevator Manufacturers	3,323,500
3563	Conveyers, Cranes, Hoists	1,950,000
3564	Blowers and Fans	1,900
3565	Industrial Trucks	722,255
3566	Mechanical Power Transmission Products	32,065
3567	Industrial Furnaces	13,200
3568	Stokers	9,308
3569	Other General Industrial Machinery	39,136
357	Office and Store Machines	883
358	Service and Household Machines	99,230
359	Miscellaneous Machinery Components	146,496
361	Motors, Controls, Wiring Devices	199,437
362	Electric Appliances (not elsewhere classified)	279,672
364	Electric Equipment for Vehicles	15,074
366	Communication Equipment	4,871
369	Miscellaneous Electrical Products	10,271
371	Motor Vehicles and Parts	1,300,131
372	Aircraft and Parts	376,082
3731	Shipbuilding	4,000,000
3742	Railroad Cars	319,727
3799	Miscellaneous Transportation Equipment	12,820
38	Instruments	4,104
39	Miscellaneous Metal Products	141,925
	Total	69,198,000 lb

* Based on expansion of sample covering 1599 plants.

USE OF METAL CLEANERS IN METALWORKING

1951 Estimate, Pounds Used by Sub-Groups Based on Expansion of Sample of 1464 Reports*

Govt. Code	Description of Industry Groups	Emulsion Cleaners	Alkali Cleaners	Phosphating Cleaners	Vapor Solvents	Shot or Grit
19	Ordnance	183,300	695,600	387,750	1,318,820	415,010
25	Metal Furniture	665,704	1,722,583	601,606	5,219,541	303,680
332	Ferrous Foundries (job)	26,765	7,950		5,010	82,013,313
333	Nonferrous Smelting	5,320	6,650		13,300	1,371,230
335	Nonferrous Rolling Mills	12,200	390,583		1,431,975	129,320
336	Nonferrous Foundries (job)	3,360	2,478,260		604,800	3,076,920
3391	Steel Forgings (job)					3,882,600
3392	Wire Drawing (exclusively)		170,800		145,180	
3393	Welded Pipe and Tubing	30,450	61,935	37,700	1,570,060	716,300
3395	Heat Treating (job)		191,160			1,668,800
3396	Cold Rolling Mills (not integrated)		23,800		2,388,695	
341	Tin Cans	7,550	144,356		719,666	
3421-5	Hand Tools and Cutlery	84,375	662,070	7,500	2,358,600	1,751,250
3429	Hardware	675,482	1,898,858	16,500	3,372,947	5,220,600
3431-2	Plumbing Goods and Oil Burners	161,040	988,505	27,755	994,300	28,888,800
3439	Heating and Cooking Equipment	1,048,570	3,341,112	906,019	4,385,125	5,080,700
3441	Fabricated Structural Steel				902,000	2,328,800
3442	Doors, Sash, Moldings	215,660	263,835	97,375	844,600	893,800
3443	Boilers, Pressure Vessels, Tanks		47,700	63,600	508,800	5,270,850
3444	Sheet Metal Products	9,800	893,574	141,463	748,720	179,340
3481	Vitreous Enameled Products	271,177	1,211,869	2,475	115,830	182,490
3482-3	Stampings	799,994	4,229,368	231,696	11,073,296	1,372,800
3488	Electroplating (job shops)	656,477	6,899,448	174,800	4,604,887	851,000
3471	Lighting Fixtures	14,129	1,196,101	408,605	2,382,689	56,800
3489	Wire Products	189,000	1,204,545	31,500	1,385,147	1,455,300
3491	Steel Drums, Barrels	18,450	274,823	94,300	4,100	350,850
3493	Leaf and Hot-Wound Springs					320,220
3494	Bolts and Nuts	161,370	811,635		867,240	237,600
3495	Screw Machine Products	495,945	703,078	25,750	6,918,048	309,000
3496	Collapsible Tubes				776,100	
3499	Miscellaneous Fabricated Products		24,000		15,000	18,750
351	Engines (except auto and aircraft)	464,704	615,860	133,136	1,664,200	2,871,560
352	Agricultural Machinery, Tractors	65,340	2,648,542	371,475	4,828,680	8,023,500
353	Construction, Mining, Oil Field Machinery	165,753	351,445	77,584	599,130	5,868,450
3541	Machine Tools	8,580	203,280		1,003,860	2,293,500
3542	Other Metalworking Machinery	53,032	55,160	2,800	618,128	4,781,112
3543	Small Tools (Cutting, Measuring)	91,175	246,975	59	744,551	1,883,300
355	Machinery for Other Industries	111,262	578,427	287,040	3,217,987	2,827,965
356	General Industrial Machinery	339,401	1,635,580	60,800	1,824,418	4,562,280
357	Office and Store Machines	295,450	2,305,521	380,343	3,138,608	291,200
3585	Refrigerators, Air Conditioning Equipment	403,214	1,501,470	595,110	2,903,755	348,600
358 Bal.	Household and Service Machines	193,616	350,288	193,750	2,030,128	499,100
3591	Valves	142,680	380,480		838,040	2,551,840
3592	Pipe and Tube Bending, Nipples	482,975	185,250	90,000	157,500	75,000
3593	Ball and Roller Bearings	449,500	172,670		10,850,000	5,115,000
3599	Machine Parts		586,500		696,172	70,380
361	Electric Motors, Controls, Wiring Devices	178,860	7,232,425	132,000	10,697,174	4,723,950
362	Electric Appliances (Not Elsewhere Classified)	39,200	1,507,240	153,860	623,035	529,200
363	Insulated Wire and Cable		194,137		312,412	
364	Electric Equipment for Vehicles	84,360	32,800	130,500	5,847,400	2,215,550
365	Electric Lamp Bulbs	6,066,000	337,000			
3661	Radio and Electronics	13,000	399,100		2,956,421	209,300
3662	Radio Tubes	111,000			1,522,735	
3664-9	Telephone Equipment	552,500	1,071,000		4,866,250	2,150,500
369	Miscellaneous Electrical Products	210,600	338,580	40,500	337,041	
3711	Motor Cars and Trucks	603,467	4,039,660	243,904	5,854,305	4,709,160
3712-3	Motor Vehicle Bodies	247,776	417,629	648,150	1,563,448	1,177,400
3714	Motor Car Parts	574,280	7,548,660	1,392,653	10,874,513	6,129,480
3715-6	Trailers	3,150	12,600	45,360	315,000	144,900
372	Aircraft and Parts	383,295	1,329,313	455,400	15,917,610	1,888,460
373	Shipbuilding	202,200	67,400		12,132	
3742	Railroad Equipment		59,450		13,325	1,196,300
375-9	Bicycles and Miscellaneous Transportation		431,500	119,520	288,840	83,000
381-2-3	Scientific Measuring and Optical Instruments	8,990	361,692	12,710	3,335,073	677,970
384	Surgical and Dental Instruments	4,760	74,270		475,646	96,084
386	Photographic Equipment	37,100	117,660	61,904	1,124,660	15,900
387	Watches, Clocks, Watchcases		212,760	2,700	801,144	5,400
3911-4	Silverware and Jewelry	138,390	335,064	13,800	1,535,700	3,000
3941	Toys and Games	6,000	322,500		671,650	3,600
3943	Children's Vehicles		20,160	8,400	974,400	
3949	Sporting and Athletic Goods	16,320	80,448	5,040	233,400	18,960
3951	Mechanical Pencils		12,200		183,000	
3961-3	Costume Jewelry and Buttons		263,435		259,600	
3964	Slide, Snap and Hook Fasteners	11,340	546,480	10,800	189,540	
3988	Caskets	41,300	85,054	146,025	113,044	69,000
3993	Signs			135,300	522,750	
3999	Miscellaneous Metal Products	2,200	55,000	2,750	196,000	37,400
	Total	18,518,886	69,876,863	9,209,969	163,562,979	214,160,964

* Estimate for steelworkers not included because of insufficient data. Use of alkaline cleaners in steel mills in 1951 was probably 14 million lb.

7 MARKET DATA

Metal washing, pickling, electroplating, sand blasting, painting, coating, physical testing and polishing departments.

METAL CLEANING, FINISHING AND TESTING

Departments Operated by U. S. Metalworking Plants Employing 20 or More Plant Workers

WASHING OR DEGREASING

Alabama	23	Nebraska	23
Arizona	4	Nevada	
Arkansas	8	New Hampshire	22
California	455	New Jersey	270
Colorado	18	New Mexico	
Connecticut	271	New York	633
Delaware	7	North Carolina	24
District of Columbia	4	North Dakota	
Florida	15	Ohio	749
Georgia	39	Oklahoma	23
Idaho	2	Oregon	21
Illinois	772	Pennsylvania	443
Indiana	278	Rhode Island	101
Iowa	81	South Carolina	8
Kansas	30	South Dakota	
Kentucky	34	Tennessee	38
Louisiana	13	Texas	99
Maine	6	Utah	4
Maryland	60	Vermont	11
Massachusetts	296	Virginia	21
Michigan	606	Washington	22
Minnesota	98	West Virginia	24
Mississippi	10	Wisconsin	231
Missouri	134	Wyoming	
Montana	2	Total	6,033

SAND BLASTING

Alabama	31	Nebraska	20
Arizona	6	Nevada	
Arkansas	4	New Hampshire	20
California	253	New Jersey	157
Colorado	18	New Mexico	1
Connecticut	127	New York	295
Delaware	13	North Carolina	21
District of Columbia	1	North Dakota	
Florida	14	Ohio	499
Georgia	26	Oklahoma	20
Idaho	2	Oregon	29
Illinois	369	Pennsylvania	418
Indiana	181	Rhode Island	29
Iowa	61	South Carolina	7
Kansas	22	South Dakota	1
Kentucky	22	Tennessee	40
Louisiana	16	Texas	97
Maine	13	Utah	13
Maryland	37	Vermont	10
Massachusetts	190	Virginia	22
Michigan	341	Washington	36
Minnesota	51	West Virginia	19
Mississippi	7	Wisconsin	150
Missouri	90	Wyoming	1
Montana	2	Total	3,802

GALVANIZING OR TINNING

Alabama	11	Nebraska	6
Arizona	1	Nevada	
Arkansas		New Hampshire	4
California	62	New Jersey	44
Colorado	3	New Mexico	
Connecticut	38	New York	83
Delaware	3	North Carolina	9
District of Columbia	1	North Dakota	
Florida	4	Ohio	115
Georgia	8	Oklahoma	4
Idaho		Oregon	2
Illinois	91	Pennsylvania	108
Indiana	43	Rhode Island	8
Iowa	17	South Carolina	
Kansas		South Dakota	
Kentucky	6	Tennessee	8
Louisiana	4	Texas	16
Maine	4	Utah	1
Maryland	22	Vermont	
Massachusetts	64	Virginia	4
Michigan	60	Washington	6
Minnesota	16	West Virginia	8
Mississippi	3	Wisconsin	40
Missouri	31	Wyoming	
Montana		Total	954

PICKLING

Alabama	16	Nebraska	7
Arizona	2	Nevada	
Arkansas	3	New Hampshire	8
California	180	New Jersey	136
Colorado	7	New Mexico	
Connecticut	154	New York	276
Delaware	4	North Carolina	9
District of Columbia	4	North Dakota	
Florida	3	Ohio	314
Georgia	13	Oklahoma	7
Idaho	1	Oregon	9
Illinois	257	Pennsylvania	291
Indiana	119	Rhode Island	80
Iowa	24	South Carolina	2
Kansas	9	South Dakota	1
Kentucky	18	Tennessee	27
Louisiana	3	Texas	32
Maine	3	Utah	3
Maryland	27	Vermont	3
Massachusetts	173	Virginia	8
Michigan	212	Washington	17
Minnesota	26	West Virginia	16
Mississippi	1	Wisconsin	79
Missouri	57	Wyoming	1
Montana		Total	2,642

PHYSICAL TESTING

Alabama	17	Nebraska	8
Arizona	2	Nevada	
Arkansas	1	New Hampshire	16
California	151	New Jersey	137
Colorado	9	New Mexico	
Connecticut	93	New York	243
Delaware	9	North Carolina	9
District of Columbia	2	North Dakota	
Florida	4	Ohio	312
Georgia	12	Oklahoma	9
Idaho		Oregon	4
Illinois	290	Pennsylvania	255
Indiana	114	Rhode Island	17
Iowa	27	South Carolina	3
Kansas	13	South Dakota	2
Kentucky	16	Tennessee	23
Louisiana	6	Texas	40
Maine	5	Utah	6
Maryland	25	Vermont	4
Massachusetts	110	Virginia	9
Michigan	218	Washington	19
Minnesota	32	West Virginia	9
Mississippi	4	Wisconsin	93
Missouri	56	Wyoming	
Montana	3	Total	2,431

ELECTROPLATING

Alabama	7	Nebraska	8
Arizona	2	Nevada	
Arkansas	5	New Hampshire	14
California	186	New Jersey	162
Colorado	9	New Mexico	
Connecticut	189	New York	351
Delaware	2	North Carolina	7
District of Columbia	3	North Dakota	
Florida	5	Ohio	327
Georgia	19	Oklahoma	9
Idaho	1	Oregon	2
Illinois	321	Pennsylvania	217
Indiana	122	Rhode Island	70
Iowa	32	South Carolina	3
Kansas	8	South Dakota	
Kentucky	16	Tennessee	12
Louisiana	2	Texas	27
Maine	3	Utah	3
Maryland	24	Vermont	5
Massachusetts	172	Virginia	17
Michigan	246	Washington	9
Minnesota	37	West Virginia	12
Mississippi	1	Wisconsin	88
Missouri	61	Wyoming	1
Montana		Total	2,818

PAINTING AND LACQUERING

Alabama	47	Nebraska	39
Arizona	6	Nevada	
Arkansas	14	New Hampshire	31
California	693	New Jersey	397
Colorado	38	New Mexico	1
Connecticut	268	New York	873
Delaware	11	North Carolina	53
District of Columbia	7	North Dakota	4
Florida	36	Ohio	1,012
Georgia	72	Oklahoma	51
Idaho	3	Oregon	49
Illinois	1041	Pennsylvania	683
Indiana	392	Rhode Island	98
Iowa	134	South Carolina	10
Kansas	58	South Dakota	4
Kentucky	60	Tennessee	71
Louisiana	21	Texas	182
Maine	20	Utah	15
Maryland	95	Vermont	13
Massachusetts	384	Virginia	55
Michigan	718	Washington	58
Minnesota	158	West Virginia	37
Mississippi	18	Wisconsin	368
Missouri	216	Wyoming	1
Montana	4	Total	8,619

POLISHING OR BUFFING

Alabama	17	Nebraska	16
Arizona	3	Nevada	
Arkansas	8	New Hampshire	29
California	379	New Jersey	297
Colorado	22	New Mexico	
Connecticut	273	New York	695
Delaware	7	North Carolina	32
District of Columbia	4	North Dakota	3
Florida	19	Ohio	631
Georgia	39	Oklahoma	10
Idaho	1	Oregon	22
Illinois	604	Pennsylvania	414
Indiana	212	Rhode Island	106
Iowa	64	South Carolina	10
Kansas	22	South Dakota	1
Kentucky	42	Tennessee	35
Louisiana	8	Texas	82
Maine	12	Utah	6
Maryland	46	Vermont	18
Massachusetts	315	Virginia	26
Michigan	451	Washington	29
Minnesota	80	West Virginia	21
Mississippi	6	Wisconsin	201
Missouri	128	Wyoming	1
Montana		Total	5,412

All Data on This Page Were Obtained from THE IRON AGE Basic Marketing Data.

Selected business indexes: A convenient compilation of seven of the major series extending from 1919 to the present time.

BUSINESS INDEXES, FEDERAL RESERVE SYSTEM COMPILATION

Production Construction, Employment, Carloadings, Department Store Sales and Price Indexes

Year or Month	Industrial Production (Physical Volume)* 1935-39=100					Construction Contracts Awarded (Value)[1] 1947-49=100			Employment and Payrolls[2] 1947-49=100				Freight Carloadings* 1935-39=100	Department Store Sales* (retail value) 1947-49=100	Consumers Prices[2] 1935-39=100	Wholesale Commodity Prices[2] 1947-49=100
	Total		Manufactures		Minerals	Total	Residential	All Other	Non-Agricultural Employment	Manufacturing Production Workers						
			Durable	Nondurable						Employment		Payrolls				
	Adjusted	Unadjusted	Adjusted	Adjusted	Adjusted	Adjusted	Adjusted	Adjusted	Adjusted	Adjusted	Unadjusted	Unadjusted	Adjusted	Adjusted	Unadjusted	Unadjusted
1919		72	84	62	71	34	26	39	61.6		68.7	31.1	120	27	123.8	
1920		75	93	60	83	34	18	45	62.2		69.0	37.1	129	32	143.3	
1921		58	53	57	66	30	27	32	55.4		52.8	24.0	110	30	127.7	
1922		73	81	67	71	43	41	43	58.7		58.4	25.7	121	30	119.7	
1923		88	103	72	98	45	49	42	64.6		66.9	32.6	142	34	121.9	
1924		82	95	69	89	51	57	46	63.8		62.1	30.4	139	34	122.2	
1925		90	107	78	92	66	75	59	65.5		64.2	32.1	146	36	125.4	
1926		96	114	79	100	69	73	67	67.9		65.5	33.0	152	37	126.4	65.0
1927		95	107	83	100	69	71	68	68.2		64.1	32.4	147	37	124.0	62.0
1928		99	117	85	99	73	76	70	68.3		64.2	32.8	148	37	122.6	62.9
1929		110	132	93	107	63	52	70	71.3		68.3	35.0	152	38	122.5	61.9
1930		91	98	84	93	49	30	62	67.0		59.5	28.3	131	35	119.4	56.1
1931		75	67	79	80	34	22	41	60.6		50.2	21.5	105	32	108.7	47.4
1932		58	41	70	67	15	8	20	53.7		42.6	14.8	78	24	97.6	42.1
1933		69	54	79	78	14	7	18	53.9		47.2	15.9	82	24	92.4	42.8
1934		75	65	81	80	17	7	24	59.0		55.1	20.4	89	27	95.7	48.7
1935		87	83	90	86	20	13	25	61.6		58.8	23.5	92	29	98.1	52.0
1936		103	108	100	99	30	22	35	66.2		63.9	27.2	107	33	99.1	52.5
1937		113	122	106	112	32	25	36	70.6		70.1	32.6	111	35	102.7	56.1
1938		89	78	95	97	35	27	40	66.4		59.6	25.3	89	32	100.8	51.1
1939		109	109	109	106	39	37	40	69.6		66.2	29.9	101	35	99.4	50.1
1940		125	139	115	117	44	43	44	73.6		71.2	34.0	109	37	100.2	51.1
1941		162	201	142	125	68	54	74	83.1		87.9	49.3	130	44	105.2	58.8
1942		199	279	158	129	89	49	116	91.2		103.9	72.2	138	50	116.6	64.2
1943		239	360	176	132	37	24	45	96.6		121.4	99.0	137	56	123.7	67.0
1944		235	353	171	140	22	10	30	95.5		118.1	102.8	140	62	125.7	67.6
1945		203	274	166	137	36	16	50	92.1		104.0	87.8	135	70	126.6	68.8
1946		170	192	165	134	82	67	79	95.1		97.9	81.2	132	90	139.5	78.7
1947		187	220	172	149	84	66	83	99.6		103.4	97.7	143	98	159.6	96.4
1948		192	225	177	155	102	98	105	101.6		102.8	105.1	138	104	171.9	104.4
1949		176	202	168	135	113	116	111	98.8		93.8	97.2	116	98	170.2	99.2
1950		200	237	187	148	159	185	142	101.4		99.2	111.2	128	105	171.9	103.1
1951		220	273	194	164	171	170	172	106.6		105.4	129.2	134	109	185.6	114.8
1951																
January	221	216	268	201	164	178	188	171	105.2	105.8	105.2	128.8	146	125	181.5	115.0
February	221	217	271	201	158	173	187	164	105.9	106.8	106.6	128.5	129	115	183.8	116.5
March	222	219	277	199	158	163	176	154	106.3	106.9	106.6	130.0	139	105	184.5	116.5
April	223	222	279	198	164	199	170	219	106.6	107.1	106.0	129.5	138	104	184.6	116.3
May	222	223	278	198	165	193	166	211	106.8	106.8	105.0	128.1	133	104	185.4	115.9
June	221	223	274	197	165	200	174	217	107.1	106.8	105.6	129.8	131	105	185.2	115.1
July	212	214	265	187	156	162	179	150	107.1	106.0	104.2	126.4	125	105	185.5	114.2
August	217	220	267	193	165	156	176	143	107.0	104.8	105.7	128.4	133	109	185.5	113.7
September	218	223	271	192	167	147	168	133	106.8	103.9	105.8	130.9	133	108	186.6	113.4
October	218	222	274	188	174	140	160	127	106.6	103.4	105.1	129.8	135	109	187.4	113.7
November	219	220	277	188	170	158	146	162	106.8	103.3	104.3	129.8	137	113	188.6	113.6
December	218	217	282	185	163	166	145	180	107.1	103.5	104.4	132.9	133	109	189.1	113.5
1952																
January	221	217	282	189	167	161	142	173	106.8	103.6	103.2	130.4	141	108	189.1	113.0
February	222	218	284	190	167	156	163	152	107.0	103.8	103.6	131.0	136	106	187.9	112.5
March	221	217	285	188	164	164	174	157	107.0	103.7	103.6	131.9	133	105	188.0	112.3
April	216	215	277	183	166	171	189	158	107.0	104.0	102.9	128.1	126	103	188.7	111.8
May	211	211	277	181	140	168	186	156	107.1	103.4	101.8	128.1	122	108	189.0	111.6
June	204	205	247	186	147	172	193	158	106.5	100.8	99.7	126.4	108	111	189.6	111.2
July	193	194	230	179	142	177	196	165	106.0	99.2	97.5	121.1	102	105	190.8	111.6
August	214	218	266	191	157	207	193	217	107.8	103.1	103.9	133.0	125	114	191.1	112.2
September	p225	p230	p265	p194	p174	p206	p183	p221	p108.2	p104.6	p106.4	e139.8	134	p106	190.8	111.7
October†	227	e230	e269	e195	e166								127	e115	190.9	

e—Estimated; all estimates are those of the Federal Reserve.

p—Preliminary.

*—Average per working day.

†—Three-month moving average, based on F. W. Dodge Corporation data. A description of the index may be obtained from the Division of Research and Statistics.

‡—The unadjusted indexes of employment and payrolls, wholesale commodity prices, and consumers' prices are compiled by or based on data of the Bureau of Labor Statistics. Nonagricultural employment covers employees only and excludes personnel in the armed forces. The consumers' price index is the adjusted series, reflecting: (1) beginning 1940 allowances for rents of new housing units and (2) beginning January 1950, interim revision of series and weights.

(The terms "adjusted" and "unadjusted" refer to adjustment of monthly figures for seasonal variation.)

Source: Board of Governors Federal Reserve System

INDEX OF TRADE ASSOCIATIONS AND TECHNICAL SOCIETIES IN THE METALWORKING INDUSTRY

The first four pages of this listing are an index of major manufacturing and trade associations and technical societies in the metalworking industry. This is followed by an alphabetical list of these groups.

Abrasives:
Grinding Wheel Institute
Metal Abrasive Council

Acetylene Equipment:
International Acetylene Assn.

Air Conditioning:
Air Conditioning and Refrigerating Machinery Assn.
Gas Appliance Manufacturers Assn., Inc.
National Warm Air Heating and Air Conditioning Assn.

Air Drills:
Compressed Air and Gas Institute

Aircraft:
Aircraft Industries Assn. of America

Aluminum:
Aluminum Assn.
Aluminum Research Institute
Aluminum Roofing Institute
Aluminum Wares Assn.
Aluminum Window Manufacturers Assn.

Appliances:
American Home Laundry Manufacturers Assn.
Gas Appliance Manufacturers Assn., Inc.
Institute of Cooking and Heating Appliance Manufacturers

Automotive Industry:
Automobile Manufacturers Assn.
Automotive Parts Manufacturers Assn.
Automotive Tool & Dies Mfrs. Assn.
Society of Automotive Engineers
See also Trucks

Batteries:
Assn. of American Battery Manufacturers

Bearings:
Anti-Friction Bearing Manufacturers Assn., Inc.

Boilers:
American Boiler and Affiliated Industries
American Boiler Manufacturers Assn. and Affiliated Industries
Institute of Boiler and Radiator Manufacturers
Steel Boiler Institute

Brass:
Brass and Bronze Ingot Institute
Brass Forging Assn.
Copper and Brass Research Assn.

Broaching:
Broaching Tool Institute

Bronze:
Brass and Bronze Ingot Institute

Cans:
Can Manufacturers Institute, Inc.
Galvanized Ware Manufacturers Council

Cars:
American Railway Car Institute

Castings:
Alloy Casting Institute
American Die Casting Institute
Steel Castings Institute of Canada
See also Foundry

Chain:
Assn. of Roller and Silent Chain Manufacturers
Assn. of Sprocket Chain Manufacturers
Chain Institute, Inc.
Malleable Chain Manufacturers Institute

Cleaning and Finishing:
American Electroplaters' Society
American Hot Dip Galvanizers Assn.
National Assn. of Corrosion Engineers
National Assn. of Metal Finishers

Compressed Air:
Compressed Air and Gas Institute

Concrete:
Concrete Reinforcing Steel Institute

Condenser:
Heat Exchange Institute

Construction:
American Institute of Steel Construction
Concrete Reinforcing Steel Institute
Metal Lath Manufacturers Assn.
Rail Steel Bar Assn.
Steel Joist Institute

Consumer Goods:
American Home Laundry Manufacturers Assn.

Containers:
Aluminum Wares Assn.
Can Manufacturers Institute, Inc.
Collapsible Tube Manufacturers Assn.
Enameled Utensil Manufacturers Council
Galvanized Ware Manufacturers Council
Steel Shipping Container Institute
See also Boilers; Tanks

Convectors:
Convector Manufacturers Assn.

Conveyers:
Conveyor Equipment Manufacturers Assn.

Copper:
Copper and Brass Research Assn.
Copper Institute
Copper Wire Engineering Assn.
United States Copper Assn.

Corrosion:
National Assn. of Corrosion Engineers

Cranes:
Electric Overhead Crane Institute
Power Crane and Shovel Assn.

Cutting Tools:
Cutting Tool Manufacturers Assn.
Hack Saw Manufacturers Assn. of America
Machine Knife Assn.
Manufacturers of Hard Edge, Flexible Back, Metal Cutting Band Saws
Metal Cutting Tool Institute

Diamonds:
Industrial Diamond Assn. of America, Inc.

Diecasting:
American Die Casting Institute

Dies:
American Die Casting Institute
Automotive Tool & Die Mfrs. Assn.
Cutting Die Institute
National Tool and Die Manufacturers Assn.

Diesels:
Diesel Engine Manufacturers Assn.

Doors:
Hollow Metal Door and Buck Assn.
Insect Wire Screening Bureau
See also Windows

Drills:
Compressed Air and Gas Institute
Diamond Core Drill Manufacturers Assn.

Electrical Industry:
Edison Electric Institute
National Electrical Manufacturers Assn.

Electrochemistry:
Electrochemical Society

Electroplating:
American Electroplaters' Society
National Association of Metal Finishers

Enameling:
Enameled Utensil Manufacturers Council
National Assn. of Metal Finishers
Porcelain Enamel Institute

Engineers:
Automotive Engineers, Society of
Corrosion Engineers, National Assn. of
Engineering Companies, National Assn. of
Iron and Steel Engineers, Assn. of
Lubrication Engineers, American Society of
Mechanical Engineers, American Society of
Plastics Engineers, Inc., Society of
Tool Engineers, American Society of

Engines:
Diesel Engine Manufacturers Assn.
Internal Combustion Engine Institute

Exporters:
Amtea Corp. (American Machine Tool Export Associates)
Machinery-Metals Export Club
National Assn. of Steel Exporters

Farm Equipment:
Farm Equipment Institute

Fasteners:
Industrial Fasteners Institute
Socket Screw Products Bureau
Spring Washer Institute
Tubular and Split Rivet Council
United States Machine Screw Service Bureau

Finishing, see Cleaning and Finishing

Fittings:
Manufacturers Standardization Society of the Valve and Fittings Industry
Pipe Fittings Manufacturers Assn.

Flooring:
Open Steel Flooring Institute, Inc.

Forging:
Aluminum Assn.
Brass Forging Assn.
Drop Forging Assn.
Forged Tool Society
Forging Manufacturers Assn.

Foundry:
American Foundrymen's Society
Foundry Equipment Manufacturers Assn.
Foundry Supply Manufacturers Assn.
Gray Iron Founders Society
Malleable Founders' Society
National Foundry Assn.
Non-Ferrous Founders' Society
Steel Founders Society of America
See also Castings

Fuel:
American Gas Assn.

Furnaces, Heat Treating, Melting, Processing:
Industrial Furnace Manufacturers Assn., Inc.

Furnaces, Openhearth:
National Openhearth Committee, Iron and Steel Div., AIME

Galvanizing:
American Hot Dip Galvanizers Assn.
Galvanized Ware Manufacturers Council

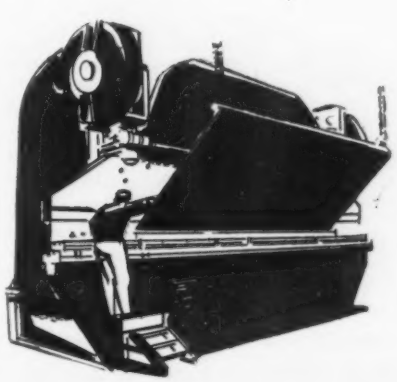
Gas:
American Gas Assn.
Compressed Air and Gas Institute
Compressed Gas Assn., Inc.
Gas Appliance Manufacturers Assn., Inc.

Gears:
American Gear Manufacturers Assn.

Gold:
Gold Mining Assn. of America

Grinding:
Grinding Wheel Institute

Hardware:
American Hardware Manufacturers Assn.
American Steel Warehouse Assn.
Bright Wire Goods Manufacturers Service Bureau
Hardware Cloth and Poultry Netting Institute



Heat Treating:
Industrial Furnace Manufacturers Assn., Inc.
Metal Treating Institute

Heating:
Convector Manufacturers Assn.
Gas Appliance Manufacturers Assn.
Heat Exchange Institute
Industrial Furnace Manufacturers Assn., Inc.
Institute of Boiler and Radiator Manufacturers
Institute of Cooking and Heating Appliance Manufacturers
National Assn. of Fan Manufacturers, Inc.
National Electrical Manufacturers Assn.
National Warm Air Heating and Air Conditioning Assn.
National Warm Air Register Manufacturers Institute

Hoists:
Electric Hoist Manufacturers Assn.
See also Cranes; Material Handling

Hydraulics:
Hydraulic Institute

Ingots:
Brass and Bronze Ingot Institute

Instruments:
Instrument Society of America
Scientific Apparatus Makers of America

Iron:
American Iron and Steel Institute
Assn. of Iron and Steel Engineers
Gray Iron Founders' Society, Inc.
Institute of Scrap Iron and Steel
Iron and Steel Div., AIME

Iron Ore:
Lake Superior Iron Ore Assn.

Joists:
Steel Joist Institute

Knives:
Machine Knife Assn.

Lath:
Metal Lath Manufacturers Assn.

Laundries:
American Home Laundry Manufacturers Assn.

Lead:
Lead Industries Assn.
Tri-State Zinc and Lead Ore Producers Assn.

Lubrication:
American Society of Lubrication Engineers

Machine Tools:
American Machine Tool Distributors Assn.
American Society of Tool Engineers

7 TRADE GROUPS

Technical societies, industry and business associations, etc. Index: M to S . . .

Amtea Corp. (American Machine Tool Export Associates)
National Machine Tool Builders Assn.
National Screw Machine Products Assn.

Machinery:
American Machine & Parts Assn.
American Supply & Machinery Manufacturers Assn., Inc.
Machinery and Allied Products Institute
Machinery Dealers National Assn.
Machinery-Metals Export Club

Magnesium:
Magnesium Assn.

Manganese:
American Manganese Producers Assn.

Manufacturers:
National Assn. of Manufacturers
See also Specific Product

Marking Devices:
Marking Device Assn.

Materials Handling:
Assn. of Lift Truck and Portable Elevator Manufacturers
Caster and Floor Truck Manufacturers Assn.
Conveyor Equipment Manufacturers Assn.
Electric Hoist Manufacturers Assn.
Electric Industrial Truck Assn.
Electric Overhead Crane Institute
Material Handling Institute
Power Crane and Shovel Assn.

Mechanics:
American Society of Mechanical Engineers

Metal Powder:
Metal Powder Assn.

Metallurgy:
American Institute of Mining & Metallurgical Engineers
Mining and Metallurgical Society of America

Metals:
American Bureau of Metal Statistics
American Society of Metals
Association of Iron and Steel Engineers
Institute of Metals Div., AIME
Machinery-Metals Export Club
Metal Abrasive Council
National Assn. of Architectural Metal Manufacturers
National Assn. of Corrosion Engineers
National Assn. of Metal Finishers
National Assn. of Sheet Metal Distributors
National Metal Spinners Assn.
National Metal Trades Assn.
Pressed Metal Institute
See also Specific Metal

Mining:
Aluminum Assn.
American Bureau of Metal Statistics

American Institute of Mining & Metallurgical Engineers
American Iron and Steel Institute
American Manganese Producers Assn.
American Mining Congress
American Zinc Institute
Colorado Mining Assn.
Copper Institute
Gold Mining Assn. of America
Lake Superior Iron Ore Assn.
Lead Industries Assn.
Magnesium Assn.
Mining and Metallurgical Society of America
U. S. Copper Assn.
Utah Mining Assn.

Nonferrous Metals:
Nonferrous Founders Society
See also Specific Metal

Office Equipment:
Office Equipment Manufacturers Institute

Ordnance:
American Ordnance Assn.

Ore:
The Lake Superior Iron Ore Assn.
Tri-State Zinc and Lead Ore Producers Assn.
See also Mining

Petroleum:
National Petroleum Assn.

Pipe:
American Iron and Steel Institute
Cast Iron Pipe Research Assn.
Cast Iron Pressure Pipe Institute
National Assn. of Pipe Nipple Manufacturers, Inc.
Pipe Fittings Manufacturers Assn.
See also Tubes

Plastics:
Society of Plastics Engineers, Inc.

Plate:
American Iron and Steel Institute
Steel Plate Fabricators Assn.

Porcelain Enamel, see Enameling

Powdered Metal, see Metal Powder

Power Transmission:
Multiple V-Belt Drive and Mechanical Power Transmission Assn.
Power Transmission Council, Inc.

Pumps:
Gasoline Pump Manufacturers Assn.
Hydraulic Institute

Purchasing Agents:
National Assn. of Purchasing Agents

Radiators:
Convector Manufacturers Assn.
Institute of Boiler and Radiator Manufacturers

Radio:
National Electrical Manufacturers Assn.
Radio & Television Manufacturers Assn.

Railroads:
Assn. of American Railroads

Railway Equipment:
American Iron and Steel Institute
American Railway Car Institute
Rail Steel Bar Assn.

Refrigeration:
Air Conditioning and Refrigerating Machinery Assn.
Gas Appliance Manufacturers Assn.
National Electrical Manufacturers Assn.

Research:
Tin Research Institute, Inc.

Rivets:
Industrial Fasteners Institute
Tubular and Split Rivet Council

Rolling Mills:
Roll Manufacturers Institute
Rolling Mill Machinery and Equipment Assn.

Roofing:
Aluminum Roofing Institute
National Assn. of Sheet Metal Distributors

Rustproofing:
National Assn. of Metal Finishers

Safety Equipment:
Industrial Safety Equipment Assn.

Saws:
Hack Saw Manufacturers Assn. of America
Manufacturers of Hard Edge, Flexible Back, Metal Cutting Band Saws

Scales:
Scientific Apparatus Makers of America

Scientific Apparatus:
Scientific Apparatus Makers Assn.

Scrap:
Institute of Scrap Iron and Steel, Inc.
National Assn. of Waste Material Dealers

Manufacturers, business and industry associations and technical societies of the United States Index: S through Z . . .

7 TRADE GROUPS

Screen, see **Wire and Wire Screen**

Screw Machine Products:
National Screw Machine Products Assn.

Screws:
Socket Screw Products Bureau
United States Machine Screw Service Bureau

Sheet Metal:
National Assn. of Sheet Metal Distributors

Shipbuilders:
Shipbuilders Council of America

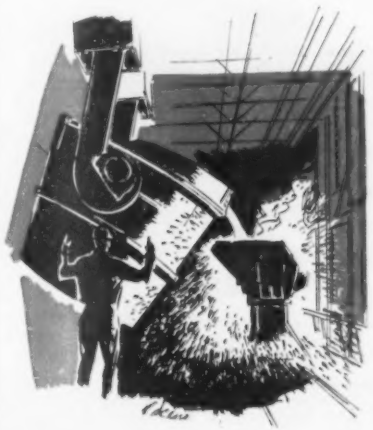
Spinning:
National Metal Spinners Assn.

Springs:
Spring Manufacturers Assn.

Stampings:
Pressed Metal Institute

Standards:
American Standards Assn.
Manufacturers Standardization Society of the Valves and Fittings Industry

Steel:
American Institute of Steel Construction
American Iron and Steel Institute
American Steel Warehouse Assn., Inc.
Assn. of Iron and Steel Engineers
Assn. of Steel Distributors
Concrete Reinforcing Steel Institute
Electric Furnace Steel Committee, Iron and Steel Div.
Institute of Scrap Iron and Steel
Iron and Steel Div., AIME
National Assn. of Steel Exporters
Open Steel Flooring Institute
Rail Steel Bar Assn.
Steel Boiler Institute
Steel Castings Institute of Canada
Steel Founders Society of America
Steel Plate Fabricators Assn.
Steel Products Warehouse Assn.
Steel Shipbuilding Institute, Inc.



Steel Shipping Container Institute, Inc.
Steel Tank Institute
Steel Window Institute

Stoker:
American Boiler and Affiliated Industries

Stoves:
Institute of Cooking and Heating Appliance Manufacturers

Tanks:
Alloy Tank Manufacturers Council
Domestic Water Tank Manufacturers Council
National Truck Tank and Trailer Tank Institute
Steel Tank Institute

Television:
Radio & Television Manufacturers Assn.

Testing:
American Society for Testing Materials
Society for Non-Destructive Testing

Tin:
American Tin Trade Assn.
International Tin Study Group
Tin Research Institute, Inc.

Tool Makers:
Machinists Vise Assn.

Tools:
American Society of Tool Engineers
Automotive Tool & Die Mfrs. Assn.
Broaching Tool Institute
Carbon Wrench Statistical Service
Compressed Air and Gas Institute
Cutting Tool Manufacturers Assn.
Electric Tool Institute
Forged Tool Society
Hack Saw Manufacturers Assn.
Machinists Vise Assn.
Manufacturers of Hard Edge, Flexible Back, Metal Cutting Band Saws
Metal Cutting Tool Institute
National Tool and Die Manufacturers Assn.
Service Tool Institute
See also Cutting Tools

Tractors:
Automobile Manufacturers Assn.
Farm Equipment Institute

Trailers:
National Truck Tank and Trailer Tank Institute
Truck Trailer Manufacturers Assn.

Transportation:
Assn. of American Railroads

Trucks:
Assn. of Lift Truck and Portable Elevator Manufacturers
Caster and Floor Truck Manufacturers Assn.
Industrial Truck Assn.
National Truck Body Manufacturers and Distributors
Truck Trailer Manufacturers Assn.

Tubes:
Collapsible Tube Manufacturers Assn.
Formed Steel Tube Institute:
See also Pipe

Utensils:
Enameled Utensil Manufacturers Council

Valves:
Manufacturers Standardization Society of the Valve and Fittings Industry
Pipe Fittings Manufacturers Assn.
Valve Manufacturers Assn.

V-Belt:
Multiple V-Belt Drive Assn.

Vises:
Machinists Vise Assn.

Warehouses:
American Steel Warehouse Assn., Inc.
Steel Products Warehouse Assn.

Washers:
Spring Washer Institute

Waste Material:
Institute of Scrap Iron and Steel
National Assn. of Waste Material Dealers

Weighing Machines:
Scientific Apparatus Makers of America

Welding:
American Welding Society
American Weldment Manufacturers Assn.
National Welding Supply Assn.
Resistance Welder Mfrs. Assn.

Windows:
Aluminum Window Mfrs. Assn.
Steel Window Institute
See also Doors

Wire and Wire Screen:
Bright Wire Goods Manufacturers Service Bureau
Copper Wire Engineering Assn.
Fine and Specialty Wire Manufacturers Assn.
Hardware Cloth and Poultry Netting Institute
Industrial Wire Cloth Institute
Insect Wire Screening Bureau
National Electrical Mfrs. Assn.
Wire Assn.
Wire Reinforcement Institute

Wrenches:
Carbon Wrench Statistical Service

Zinc:
American Zinc Institute, Inc.
Tri-State Zinc and Lead Ore Producers Assn.

7 GROUPS

Manufacturing associations and other trade groups in the metalworking industry, with addresses and officers. A to B . . .

METALWORKING TRADE ASSOCIATIONS AND TECHNICAL SOCIETIES

Air Conditioning and Refrigerating Machinery Assn.
Southern Bldg., Washington 5, D. C.
Exec. Vice-Pres.: Wm. B. Henderson

Aircraft Industries Assn. of America
610 Shoreham Bldg., Washington 5, D. C.
Pres.: DeWitt C. Ramsey

Alloy Casting Institute
32 Third Ave., Mineola, N. Y.
Exec. Vice-Pres.: E. A. Schoefer

Alloy Tank Manufacturers Council
Keith Bldg., Cleveland 15, Ohio
Commissioner: Harry A. Sieck

Aluminum Assn.
420 Lexington Ave., New York 17, N. Y.
Secy.-Treas.: Donald M. White

Aluminum Research Institute
20 N. Wacker Drive, Chicago 6, Ill.
Secy.: Carl H. Burton

Aluminum Roofing Institute
209 Cedar Ave., Washington 12, D. C.
Secy.: D. J. Condon

Aluminum Wares Assn.
1506 First National Bank Bldg., Pittsburgh 22, Pa.
Secy.: Stuart J. Swensson

Aluminum Window Manufacturers Assn.
74 Trinity Place, New York 6, N. Y.
Secy. & Counsel: Herbert S. Blake, Jr.

American Boiler and Affiliated Industries
15 Park Row, New York 7, N. Y.
Mgr.: Henry E. Aldrich

American Boiler Manufacturers Assn. and Affiliated Industries
1571 W. 117th St., Cleveland 7, Ohio
Secy.: A. C. Baker

American Bureau of Metal Statistics
50 Broadway, New Yok, N. Y.
Director: R. R. Eckert

American Die Casting Institute
366 Madison Ave., New York 17, N. Y.
Secy.: W. J. Parker

American Electroplaters' Society
445 Broad St., Newark 2, N. J.
Exec. Secy.: D. Gardner Foulke

American Foundrymen's Society
616 S. Michigan Ave., Chicago 5, Ill.
Secy.-Treas.: W. W. Maloney

American Gas Assn.
420 Lexington Ave., New York 17, N. Y.
Managing Dir.: H. Carl Wolf

American Gear Manufacturers Assn.
Empire Bldg., Pittsburgh 22, Pa.
Exec. Secy.: J. C. Sears

American Hardware Manufacturers Assn.
342 Madison Ave., New York 17, N. Y.
Secy.: Arthur L. Faubel

American Home Laundry Manufacturers Assn.
20 N. Wacker Dr., Chicago 6, Ill.
Exec. Secy.: John J. Reinecke

American Hot Dip Galvanizers Assn.
1506 First National Bank Bldg., Pittsburgh 22, Pa.
Secy.-Treas.: Stuart J. Swensson

American Institute of Mining & Metallurgical Engineers
29 W. 39th St., New York 18, N. Y.
Secy.: Edward H. Robie

American Institute of Steel Construction
101 Park Ave., New York 17, N. Y.
Exec. Vice-Pres.: L. Abbett Post

American Iron and Steel Institute
350 Fifth Ave., New York 1, N. Y.
Exec. Dir.: Max D. Howell

American Machine and Parts Assn.
910 17th St., Washington 6, D. C.
Secy.: D. H. Reynolds

American Machine Tool Distributors Assn.
1900 Arch St., Philadelphia 3, Pa.
Exec. Secy.: Thos. A. Fernley, Jr.

American Manganese Producers Assn.
National Press Bldg., Washington 4, D. C.
Pres.: J. C. Adkerson

American Mining Congress
1200 18th St., Washington 6, D. C.
Exec. Vice-Pres.: Julian D. Conover

American Ordnance Assn.
Mills Bldg., Washington 6, D. C.
Exec. Vice-Pres.: L. A. Codd

American Railway Car Institute
19 Rector St., New York 6, N. Y.
Secy.: W. C. Tabbert

American Society of Lubrication Engineers
343 S. Dearborn St., Chicago 4, Ill.
Admin. Secy.: William P. Youngclaus, Jr.

American Society of Mechanical Engineers
29 W. 39th St., New York 18, N. Y.
Secy.: C. E. Davies

American Society for Metals
7301 Euclid Ave., Cleveland 3, Ohio
Secy.: W. H. Eisenman

American Society for Testing Materials
1916 Race St., Philadelphia 3, Pa.
Exec. Secy.: Robert J. Painter

American Society of Tool Engineers
10700 Puritan Ave., Detroit 21, Mich.
Exec. Secy.: Harry E. Conrad

American Standards Assn.
70 E. 45th St., New York 17, N. Y.
Managing Dir.: G. F. Hussey, Jr.

American Steel Warehouse Assn., Inc.
442 Terminal Tower, Cleveland 13, Ohio
Pres.: Walter S. Doxsey

American Supply & Machinery Manufacturers Assn., Inc.
814 Clark Bldg., Pittsburgh 22, Pa.
Gen. Mgr.: R. Kennedy Hanson

American Tin Trade Assn., Inc.
75 West St., New York 6, N. Y.
Secy.: Ethel M. Foley

American Welding Society
33 W. 39th St., New York 18, N. Y.
Secy.: J. G. Magrath

American Weldment Manufacturers Assn.
332 S. Michigan Ave., Chicago 4, Ill.
Pres.: Byrne Marcellus

American Zinc Institute, Inc.
60 E. 42nd St., New York 17, N. Y.
Exec. Vice-Pres. & Secy.: E. V. Gent

Amtea Corp.
30 Church St., New York 7, N. Y.
Secy.: Ralph W. Burk

Anti-Friction Bearing Manufacturers Assn., Inc.
60 E. 42nd St., New York 17, N. Y.
Secy.-Mgr.: H. O. Smith

Assn. of American Battery Manufacturers
First National Tower Bldg., Akron 8, Ohio
Commissioner: V. L. Smithers

Assn. of American Railroads
Transportation Bldg., Washington 6, D. C.
Pres.: Wm. T. Faricy

Assn. of Iron and Steel Engineers
1010 Empire Bldg., Pittsburgh 22, Pa.
Managing Dr.: T. J. Ess

Assn. of Lift Truck & Portable Elevator Mfrs.
P. O. Box 66, Medfield, Mass.
Exec. Secy.: J. A. Goldthwait

Assn. of Roller and Silent Chain Manufacturers
c/o Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Secy.: C. W. Beauchamp

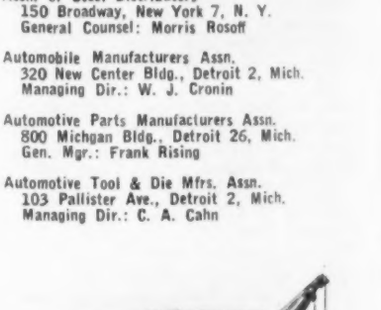
Assn. of Sprocket Chain Manufacturers
11 S. La Salle St., Chicago 3, Ill.
Exec. Secy.: Mark L. Patterson

Assn. of Steel Distributors
150 Broadway, New York 7, N. Y.
General Counsel: Morris Rosoff

Automobile Manufacturers Assn.
320 New Center Bldg., Detroit 2, Mich.
Managing Dir.: W. J. Cronin

Automotive Parts Manufacturers Assn.
800 Michgan Bldg., Detroit 26, Mich.
Gen. Mgr.: Frank Rising

Automotive Tool & Die Mfrs. Assn.
103 Pallister Ave., Detroit 2, Mich.
Managing Dir.: C. A. Cahn



Brass and Bronze Ingot Institute
308 W. Washington St., Chicago 6, Ill.
Secy.-Mgr.: Isadore Glueck

Brass Forging Assn.
420 Lexington Ave., New York 17, N. Y.
Secy.: T. E. Veltfort

Bright Wire Goods Manufacturers Service Bureau
53 Park Pl., New York 7, N. Y.
Secy.: George P. Byrne

Broaching Tool Institute
74 Trinity Place, New York 6, N. Y.
Secy.: Montgomery S. Blake

Manufacturing associations and other trade groups in the metalworking industry, with addresses and officers. C to M . . .

TRADE G

Can Manufacturers Institute, Inc.
Shoreham Bldg., Washington 5, D. C.
Exec. Vice-Pres.: H. Ferris White

60 East 42nd St., New York 17, N. Y.
Secy.-Treas.: Clifford E. Sifton

Carbon Wrench Statistical Service
53 Park Pl., New York 7, N. Y.
Secy.: George P. Byrne

Cast Iron Pipe Research Assn.
122 S. Michigan Ave., Chicago 3, Ill.
Managing Dir.: Thos. F. Wolfe

Cast Iron Pressure Pipe Institute
Warner Bldg., Washington 4, D. C.
Exec. Vice-Chairman: S. E. Linderman

Caster and Floor Truck Manufacturers Assn.
27 East Monroe St., Chicago 3, Ill.
Exec. Secy.: Harry P. Dolan

Chain Institute, Inc.
208 S. LaSalle St., Chicago 4, Ill.
Managing Dir.: D. A. Merriman

Colorado Mining Assn.
204 State Office Bldg., Denver 2, Colo.
Exec. Dir.: Robert S. Palmer

Collapsible Tube Manufacturers Assn.
19 W. 44th St., New York 36, N. Y.
Secy.: Lester B. Platt

Compressed Air and Gas Institute
122 E. 42nd St., New York 17, N. Y.
Secy.: Frank P. Anderson

Compressed Gas Assn., Inc.
11 W. 42nd St., New York 18, N. Y.
Secy.-Treas.: F. R. Fetherston

Concrete Reinforcing Steel Institute
38 S. Dearborn St., Chicago 3, Ill.
Managing Dir.: H. C. Delzell

Convector Manufacturers Assn.
c/o Young Radiator Co., Racine, Wis.
Vice-Pres.: W. G. Schlichting

Conveyor Equipment Manufacturers Assn.
No. 1 Thomas Circle, Washington 5, D. C.
Exec. Vice-Pres.: R. C. Sollenberger

Copper and Brass Research Assn.
420 Lexington Ave., New York 17, N. Y.
Manager: T. E. Veltfort

Copper Institute
50 Broadway, New York 4, N. Y.
Secy.: R. R. Eckert

Copper Wire Engineering Assn.
806 15th St., N. W., Washington 5, D. C.

Cutting Die Institute
1643 National Bank Bldg., Detroit 26, Mich.
Exec. Mgr.: M. R. Liles

Cutting Tool Manufacturers Assn.
416 Penobscot Bldg., Detroit 26, Mich.
Exec. Secy.: Martin J. Ewald

Diamond Core Drill Manufacturers Assn.
122 E. 42nd St., New York 17, N. Y.
Secy.: Frank P. Anderson

Diesel Engine Manufacturers Assn.
1 N. LaSalle St., Chicago 2, Ill.
Exec. Dir.: Harvey T. Hill

Domestic Water Tank Manufacturers Council
Keith Bldg., Cleveland 15, Ohio
Commissioners: Hunter-Thomas' Associates

Drop Forging Assn.
605 Hanna Bldg., Cleveland 15, Ohio
Secy.-Treas.: Raymond M. Seabury

Edison Electric Institute
420 Lexington Ave., New Yok 17, N. Y.
Managing Dir.: H. S. Bennion

Electric Furnace Steel Committee, Iron & Steel Div., AIME
29 W. 39th St., New York 18, N. Y.
Secy.: E. O. Kirkendall

Electric Hoist Manufacturers Assn.
71 W. 35th St., New York 1, N. Y.
Secy.: E. Donald Tolles

Electric Overhead Crane Institute
74 Trinity Place, New York 6, N. Y.
Secy.: Montgomery S. Blake

Electric Tool Institute
1108 Clark Bldg., Pittsburgh 22, Pa.
Commissioner: R. Kennedy Hanson

Electrochemical Society
235 W. 102nd St., New York 25, N. Y.
Secy.: Dr. H. B. Linford

Enameled Utensil Manufacturers Council
Keith Bldg., Cleveland 15, Ohio
Commissioners: Hunter-Thomas' Associates

Farm Equipment Institute
608 S. Dearborn St., Chicago 5, Ill.
Exec. Secy.: Robert A. Jones

Fine and Specialty Wire Manufacturers Assn.
839 17th St., Washington 6, D. C.
Secy.-Treas.: Wm. A. Penrose

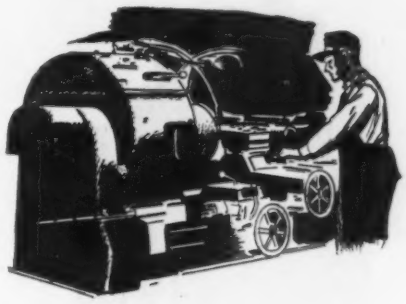
Forged Tool Society
Law & Finance Bldg., Pttsburgh 19, Pa.
Exec. Secy.: G. D. Shrum

Forging Manufacturers Assn.
366 Madison Ave., New York 17, N. Y.
Secy.: W. J. Parker

Formed Steel Tube Institute
1138 Hanna Bldg., Cleveland 15, Ohio
Exec. Secy.: Jehu R. Derrickson

Foundry Equipment Manufacturers Assn.
Engineers Bldg., Cleveland 14, Ohio
Exec. Secy.: Arthur J. Tuscany

Foundry Supply Manufacturers Assn.
1508 Law & Finance Bldg., Pittsburgh 19, Pa.
Exec. Secy.: G. D. Shrum



Galvanized Ware Manufacturers Council
Keith Bldg., Cleveland 15, Ohio
Commissioners: Hunter-Thomas' Associates

Gas Appliance Manufacturers Assn., Inc.
60 E. 42nd St., New York 17, N. Y.
Managing Dir.: H. Leigh Whitelaw

Gasoline Pump Manufacturers Assn.
420 Lexington Ave., New York 17, N. Y.
Managing Dir.: G. Denny Moore

Gold Mining Assn. of America
251 Kearney St., San Francisco 8, Calif.
Mgr.: Claude M. Chaplin

Gray Iron Founders' Society, Inc.
210 National City—E. 6th Bldg., Cleveland 14, Ohio
Exec. Vice-Pres.: D. H. Workman

Grinding Wheel Institute
2130 Keith Bldg., Cleveland 15, Ohio
Mgrs.: Hunter-Thomas' Associates

Hack Saw Manufacturers Assn. of America
350 Madison Ave., New York 17, N. Y.
Secy.: William P. Jeffery

Hardware Cloth and Poultry Netting Institute
74 Trinity Place, New York 6, N. Y.
Secy.: Ralph W. Bacon

Heat Exchange Institute
122 E. 42nd St., New York 17, N. Y.
Secy.: Frank P. Anderson

Hollow Metal Door and Buck Assn.
501 Fifth Ave., New York 17, N. Y.
Exec. Secy.: Sidney O. Raphel

Hydraulic Institute
122 E. 42nd St., New York 17, N. Y.
Secy.: Frank P. Anderson

Industrial Diamond Assn. of America, Inc.
124 E. 40th St., New York 16, N. Y.
Exec. Mgr.: Athos D. Leveridge

Industrial Fasteners Institute
3648 Euclid Ave., Cleveland 15, Ohio
Secy.-Treas.: J. D. Eggers

Industrial Furnace Manufacturers Assn., Inc.
412 Fifth St., N. W., Washington, D. C.
Mgr.: C. L. Ipsen

Industrial Safety Equipment Assn.
366 Madison Ave., New York 17, N. Y.
Secy.: W. J. Parker

Industrial Truck Assn.
Washington Loan & Trust Bldg., Washington 4, D. C.
Managing Dir.: William Van C. Brandt

Industrial Wire Cloth Institute
74 Trinity Pl., New York 6, N. Y.
Secy.: Ralph W. Bacon

Insect Wire Screening Bureau
74 Trinity Pl., New York 6, N. Y.
Secy.: Ralph W. Bacon

Institute of Boiler and Radiator Manufacturers
60 E. 42nd St., New York 17, N. Y.
Gen. Mgr.: R. E. Ferry

Institute of Cooking and Heating Appliance Manufacturers
Shoreham Hotel, Washington 8, D. C.

Institute of Metals Div., AIME
29 W. 39th St., New York 18, N. Y.
Secy.: E. O. Kirkendall

Institute of Scrap Iron and Steel Inc.
1729 H St., N. W., Washington 6, D. C.
Exec. Vice-Pres.: Edwin C. Barringer

Instrument Society of America
1319 Allegheny Ave., Pittsburgh 33, Pa.
Mgr.: Percy V. Jones, Jr.

Internal Combustion Engine Institute
201 N. Wells St., Chicago 6, Ill.
Exec. Secy.: Charles G. Spice

International Acetylene Assn.
30 E. 42nd St., New York 17, N. Y.
Secy.: H. F. Reinhard

International Tin Study Group
7 Carel van Bylandtlaan, The Hague, Netherlands
Secy.: W. Fox

Iron & Steel Div., AIME
29 W. 39th St., New York 18, N. Y.
Secy.: E. O. Kirkendall

The Lake Superior Iron Ore Assn.
1400 Hanna Bldg., Cleveland 15, Ohio
Pres.: Franklin G. Pardee

Lead Industries Assn.
420 Lexington Ave., New York 17, N. Y.
Secy.-Treas.: Robert L. Zienfeld

Machine Knife Assn.
c/o Herpenstall Co., Pittsburgh, Pa.
Pres.: John P. Roche

Machinery and Allied Products Institute
120 S. LaSalle St., Chicago 3, Ill.
Pres.: W. J. Kelly

Machinery Dealers National Assn.
1346 Connecticut Ave., Washington 6, D. C.
Exec. Dir.: R. K. Vinson

Machinery-Metals Export Club
330 W. 42nd St., New York 36, N. Y.
Secy. & Treas.: F. J. Muller

Machinists Vise Assn.
c/o Desmond Stephan Mfg. Co., Urbana, Ohio
Secy.: R. S. McConnell

Magnesium Assn.
122 E. 42nd St., New York 17, N. Y.
Asst. Secy.: (Miss) M. I. Hansen

Malleable Chain Manufacturers Institute
11 S. La Salle St., Chicago 3, Ill.
Exec. Secy.: Mark L. Patterson

Malleable Founders' Society
1800 Union Commerce Bldg., Cleveland 14, Ohio
Managing Dir.: Lowell D. Ryan

Manufacturers of Hard Edge, Flexible Back Metal Cutting Band Saws
350 Madison Ave., New York 17, N. Y.
Secy.: William P. Jeffery

Manufacturers Standardization Society of the Valve and Fittings Industry
420 Lexington Ave., New York 17, N. Y.
Exec. Secy.: Lester W. Benoit

Marking Device Assn.
134 N. LaSalle St., Chicago 2, Ill.
Secy. & Gen. Mgr.: Elmer F. Way

7 TRADE GROUPS

Manufacturing associations and other trade and professional groups and societies, with addresses and officers. M through W . . .

Material Handling Institute, Inc.
811 Clark Bldg., Pittsburgh 22, Pa.
Managing Dir.: R. Kennedy Hanson

Metal Abrasive Council
Engineers Bldg., Cleveland 14, Ohio
Exec. Secy.: Arthur J. Tuscany

Metal Cutting Tool Institute
405 Lexington Ave., New York 17, N. Y.
Pres.: Mason Britton

Metal Lath Manufacturers Assn.
Engineers Bldg., Cleveland 14, Ohio
Managing Dir.: Donald R. Wadle

Metal Powder Assn.
420 Lexington Ave., New York 17, N. Y.
Acting Secy.: Robert L. Ziegfeld

Metal Treating Institute
271 North Ave., New Rochelle, N. Y.
Exec. Secy.: C. E. Herington

Mining and Metallurgical Society of America
11 Broadway, New York 4, N. Y.
Secy.: Donald M. Liddell

Mining Assn. of Montana
505 Montana Standard Bldg., Butte, Mont.
Secy.-Treas.: Carl J. Trauerman

Multiple V-Belt Drive and Mechanical Power Transmission Assn.
27 East Monroe St., Chicago 3, Ill.
Exec. Secy.: Harry P. Dolan

National Assn. of Architectural Metal Manufacturers
7209 Cedar Ave., Washington 12, D. C.
Secy.-Treas.: O. J. Condon

National Assn. of Corrosion Engineers
1061 M & M Bldg., Houston 2, Texas
Exec. Secy.: A. B. Campbell

National Assn. of Engineering Companies
1601-13 Dime Bldg., Detroit 26, Mich.
Exec. Secy.: A. Stewart Kerr

National Assn. of Fan Manufacturers, Inc.
2159 Guardian Bldg., Detroit 26, Mich.
Secy.: Lewis O. Monroe

National Assn. of Manufacturers
14 W. 49th St., New York 20, N. Y.
Managing Dir.: Earl Bunting

National Assn. of Metal Finishers, Inc.
2117 LeRoy Place, N. W., Washington 8, D. C.
Exec. Secy.: Raymond M. Shock

National Assn. of Pipe Nipple Manufacturers, Inc.
501 Fifth Ave., New York 17, N. Y.
Secy.: H. A. Long, Jr.

National Assn. of Purchasing Agents
11 Park Place, New York 7, N. Y.
Exec. Secy.: George A. Renard

National Assn. of Sheet Metal Distributors
1900 Arch St., Philadelphia 3, Pa.
Exec. Secy.: Thomas A. Fernley, Jr.

National Assn. of Steel Exporters
150 Broadway, New York 7, N. Y.
Gen. Counsel: Morris Rosoff

National Assn. of Waste Material Dealers, Inc.
271 Madison Ave., New York 16, N. Y.
Exec. Vice-Pres.: Clinton M. White

National Electrical Manufacturers Assn.
155 E. 44th St., New York 17, N. Y.
Managing Dir.: W. J. Donald

National Foundry Assn.
53 W. Jackson Blvd., Chicago 4, Ill.
Exec. Secy.: Edward J. Walsh

National Machine Tool Builders Assn.
10525 Carnegie Ave., Cleveland 6, Ohio
Gen. Mgr.: Tell Berna

National Metal Spinners Assn.
186 Joralemon St., Brooklyn 2, N. Y.
Secy.: Max M. Goldhaber

National Metal Trades Assn.
122 S. Michigan Ave., Chicago 3, Ill.
Secy.: Chas. L. Blatchford

National Openhearth Committee, Iron & Steel Div., AIME
29 W. 39th St., New York 18, N. Y.
Secy.: E. O. Kirkendall

National Petroleum Assn.
Munsey Bldg., Room 958, Washington 4, D. C.
Gen. Counsel: Fayette B. Dow

National Screw Machine Products Assn.
2860 East 130th St., Cleveland 20, Ohio
Exec. Secy.: Orrin B. Werntz

National Tool & Die Manufacturers Assn.
907 Public Square Bldg., Cleveland 13, Ohio
Exec. Secy.: George S. Eaton

National Truck Body Manufacturers and Distributors
1122 Dupont Circle Bldg., Washington 6, D. C.
Secy.-Mgr.: Shipley D. Burton

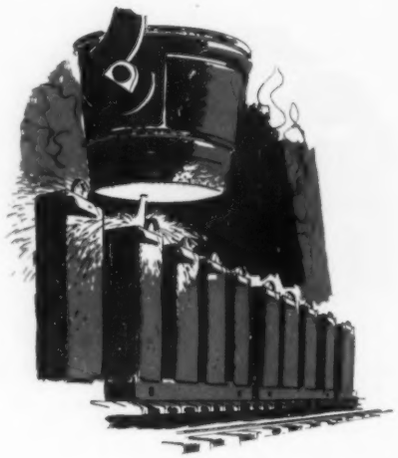
National Truck Tank and Trailer Tank Institute
120 S. LaSalle St., Chicago 3, Ill.
Exec. Secy.: Allen R. Smith

National Warm Air Heating and Air Conditioning Assn.
145 Public Sq., Cleveland 14, Ohio
Managing Dir.: George Boeddener

National Warm Air Register Manufacturers Institute
5 E. Long St., Columbus 15, Ohio
Secy.: Allen W. Williams

National Welding Supply Assn.
1900 Arch St., Philadelphia 3, Pa.
Secy.-Treas.: Robert C. Fernley

Non-Ferrous Founders' Society
192 N. Clark St., Chicago 1, Ill.
Exec. Secy.: James W. Wolfe



Office Equipment Manufacturers Institute
777 Fourteenth St., N. W., Washington, D. C.
Administrative Vice-Pres.: E. D. Taylor

Open Steel Flooring Institute, Inc.
1506 First National Bank Bldg., Pittsburgh 22, Pa.
Secy.-Treas.: Stuart J. Swensson

Pipe Fittings Manufacturers Assn.
60 E. 42nd St., New York 17, N. Y.
Secy.-Treas.: J. L. Giacomino

Porcelain Enamel Institute
1010 Vermont Ave., N. W., Washington 5, D. C.
Managing Dir.: Edward Mackasek

Power Crane and Shovel Assn.
74 Trinity Pl., New York 6, N. Y.
Secy.: Herbert S. Blake, Jr.

Power Transmission Council, Inc.
320 Broadway, New York 7, N. Y.
Vice-Pres.: E. R. Rath

Pressed Metal Institute
2860 East 130th St., Cleveland 20, Ohio
Managing Dir.: Orrin B. Werntz

Radio-Television Manufacturers Assn.
Wyatt Bldg., Suite 800
777 Fourteenth St., N. W., Washington 5, D. C.
Exec. Vice-Pres.: James D. Secrest

Rail Steel Bar Assn.
38 S. Dearborn St., Chicago 3, Ill.
Secy.: W. H. Jacobs
Pres.: O. W. Irwin

Resistance Welder Manufacturers Assn.
1900 Arch St., Philadelphia 3, Pa.
Exec. Secy.: George A. Fernley

Roll Manufacturers Institute
826 Farmers Bank Bldg., Pittsburgh 22, Pa.
Exec. Secy. & Treas.: M. K. Ulrich

Rolling Mill Machinery and Equipment Assn.
826 Farmers Bank Bldg., Pittsburgh 22, Pa.
Treas.: M. K. Ulrich

Scientific Apparatus Makers Assn.
20 N. Wacker Drive (Rm. 3120), Chicago 6, Ill.
Exec. Vice-Pres. & Secy.: Kenneth Andersen

Service Tools Institute
53 Park Place, New York 7, N. Y.
Secy.: George P. Byrne

Shipbuilders Council of America
21 West St., New York 6, N. Y.
Secy.-Treas.: C. C. Knerr

Society for Non-Destructive Testing
1109 Hinman St., Evanston, Ill.
Secy.: Philip B. Johnson

Society of Automotive Engineers
29 W. 39th St., New York 18, N. Y.
Secy. & Gen. Mgr.: John A. C. Warner

Society of Plastic Engineers, Inc.
513 Security Bank Bldg., Athens, Ohio
Exec. Secy.: Mrs. Bess R. Day

Sockets Screw Products Bureau
53 Park Pl., New York 7, N. Y.
Secy.: George P. Byrne

Spring Manufacturers Assn.
249 Main St., Bristol, Conn.
Secy.: George E. Underwood

Spring Washer Institute
74 Trinity Place, New York 6, N. Y.
Secy.: Herbert S. Blake, Jr.

Steel Boiler Institute, Inc.
1308 Land Title Bldg., Philadelphia 10, Pa.
Pres.: R. A. Locke

Steel Castings Institute of Canada
568 Booth St., Ottawa, Canada

Steel Founders' Society of America
920 Midland Bldg., Cleveland 15, Ohio
Exec. Vice-Pres.: F. Kermit Donaldson

Steel Joist Institute
1346 Connecticut Ave., Washington 6, D. C.
Managing Dir.: C. H. Luedeman

Steel Plate Fabricators Assn.
37 W. Van Buren St., Chicago 5, Ill.
Secy.: J. Dwight Evans

Steel Products Warehouse Assn.
Union Commerce Bldg., Cleveland 14, Ohio
Pres.: Clayton Grandy

Steel Shipping Container Institute, Inc.
600 Fifth Ave., New York 20, N. Y.
Pres.: L. P. Keplinger

Steel Tank Institute
120 S. LaSalle St., Chicago 3, Ill.
Exec. Secy.: Allan R. Smith

Steel Window Institute
806 Rowland Rd., Cheltenham, Pa.
Exec. Secy.: George Hingston

Tin Research Institute, Inc.
492 W. 6th Ave., Columbus 1, Ohio
Supvr., Met. Res. & Dev.: Robert J. Nekarvis

Tri-State Zinc and Lead Ore Producers Assn.
P. O. Box 879, Miami, Okla.
Secy.: C. E. Stover

Truck Trailer Manufacturers Assn.
1024 National Press Bldg., Washington 4, D. C.
Managing Dir.: John B. Hulse

Tubular and Split Rivet Council
53 Park Pl., New York 7, N. Y.
Commissioner: George P. Byrne

United States Copper Assn.
320 Broadway, New York 4, N. Y.
Secy.: R. R. Eckert

United States Machine Screw Service Bureau
53 Park Pl., New York 7, N. Y.
Managing Dir.: George P. Byrne

Utah Mining Assn.
918 Kearns Bldg., Salt Lake City 1, Utah
Mgr.: Miles P. Romney

Valve Manufacturers Assn.
60 E. 42nd St., New York 17, N. Y.
Secy.-Treas.: George A. Cooper

Wire Assn.
453 Main St., Stamford, Conn.
Exec. Secy.: Richard E. Brown

Wire Reinforcement Institute
National Press Bldg., Washington 4, D. C.
Managing Dir.: Franklin B. Brown

Conventions, meetings and expositions planned for 1953 by national industrial and trade associations in metalworking.

COMING MEETINGS

METALWORKING MEETINGS SCHEDULED FOR 1953

Technical Meetings, Conventions and Expositions in the Fields of Metalworking and Metal Production.

JANUARY

Jan. 11-13—Institute of Scrap Iron & Steel, Inc., annual convention, Commodore Hotel, New York. Institute headquarters are at 1729 H St., N. W., Washington.

Jan. 12-13—Industrial Furnace Manufacturers Assn., Inc., mid-winter meeting, Cleveland Hotel, Cleveland. Association headquarters are at 412 Fifth St., N.W., Washington.

Jan. 12-16—Society of Automotive Engineers, annual meeting and engineering display, Sheraton-Cadillac Hotel, Detroit. Society headquarters are at 29 W. 39th St., New York.

Jan. 13—Mining & Metallurgical Society of America, annual meeting, Mining Club, New York. Society headquarters are at 11 Broadway, New York.

Jan. 14-16—Compressed Air & Gas Institute, annual meeting, Dayton Biltmore Hotel, Dayton. Institute headquarters are at 122 E. 42nd St., New York.

Jan. 15-17—National Tool & Die Manufacturers Assn., winter meeting, Sorrento Hotel, Miami, Fla. Association headquarters are at 907 Public Square Bldg., Cleveland.

Jan. 19-21—Hydraulic Institute, annual meeting, The Homestead, Hot Springs, Va. Institute headquarters are at 122 E. 42nd St., New York.

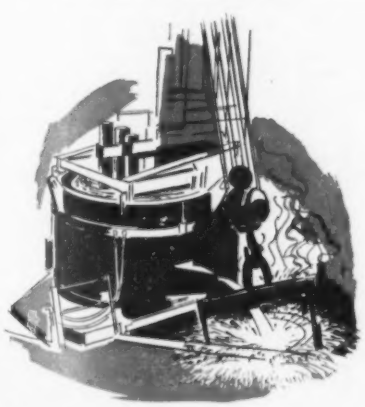
Jan. 19-22—Plant Maintenance Show, annual exhibit and conference, Cleveland Public Auditorium, Cleveland. Management: Clapp & Poliak, Inc., 341 Madison Ave., New York.

Jan. 21—American Boiler Manufacturers Assn. & Affiliated Industries, mid-winter meeting, Cleveland Hotel, Cleveland. Association headquarters are at 1571 W. 117th St., Cleveland.

Jan. 21-22—Steel Shipping Container Institute, winter meeting, Hampshire House and Pierre Hotel, New York. Institute headquarters are at 600 Fifth Ave., New York.

Jan. 21-23—Society of Plastics Engineers, Inc., annual meeting, Statler Hotel, Boston. Society headquarters are at 513 Security Bank Bldg., Athens, Ohio.

Jan. 22-23—Steel Plate Fabricators Assn., annual meeting, Palmer House, Chicago. Association headquarters are at 37 West Van Buren St., Chicago.



Jan. 26-27—Compressed Gas Assn., Inc., annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 11 W. 42nd St., New York.

Jan. 26-28—Truck Trailer Manufacturers Assn., annual convention, Edgewater Gulf Hotel, Edgewater Gulf, Miss. Association headquarters are at 1024 National Press Bldg., Washington.

FEBRUARY

Feb. 9-10—Multiple V-Belt Drive and Mechanical Power Transmission Assn., meeting, Statler Hotel, St. Louis. Association headquarters are at 27 East Monroe St., Chicago.

Feb. 16-19—American Institute of Mining & Metallurgical Engineers, annual meeting, Statler Hotel, Los Angeles. Institute headquarters are at 29 W. 39th St., New York.

MARCH

Mar. 2-6—American Society for Testing Materials, spring meeting, Statler Hotel, Detroit. Society headquarters are at 1916 Race St., Philadelphia.

Mar. 9-11—Manufacturers Standardization Society of the Valve & Fittings Industry, annual meeting, Commodore Hotel, New York. Society headquarters are at 420 Lexington Ave., New York.

Mar. 9-12—National Electrical Manufacturers Assn., mid-winter convention, Edgewater Beach Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Mar. 16-18—National Assn. of Waste Material Dealers, Inc., annual convention, Conrad Hilton Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

Mar. 16-20—American Society of Tool Engineers, annual meeting and leadership conference, Statler Hotel, Detroit. Society headquarters are at 10700 Puritan Ave., Detroit.

Mar 16-20—National Assn. of Corrosion Engineers, annual meeting, Sherman Hotel, Chicago. Association headquarters are at 1061 M & M Bldg., Houston.

Mar. 19-20—American Hot Dip Galvanizers Assn., Inc., annual meeting, Netherland Plaza Hotel, Cincinnati. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.

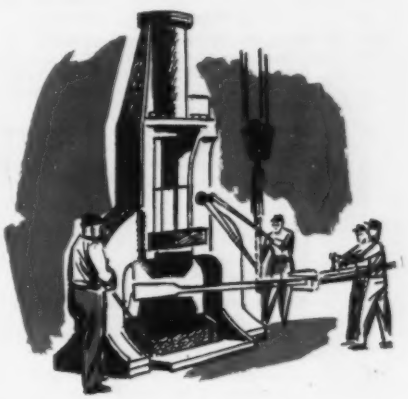
Mar. 19-23—American Society of Metals, National Metal Congress & Exposition, Cleveland. Society headquarters are at 7301 Euclid Ave., Cleveland.

Mar. 23-27—American Society for Metals, Western Metal Congress & Exposition, Los Angeles. Society headquarters are at 7301 Euclid Ave., Cleveland.

Mar. 26-27—Pressed Metal Institute, annual spring technical meeting, Carter Hotel, Cleveland. Institute headquarters are at 2860 E. 130th St., Cleveland.

APRIL

Apr. 7-9—Steel Shipping Container Institute, Inc., annual meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.



Apr. 9-11—Lead Industries Assn., annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 420 Lexington Ave., New York.

Apr. 12 - 16 — Electrochemical Society, spring meeting, Statler Hotel, New York. Society headquarters are at 235 W. 102nd St., New York.

Apr. 13-15—American Society of Lubrication Engineers, annual meeting & lubrication exhibit, Statler Hotel, Boston. Society headquarters are at 343 S. Dearborn St., Chicago.

Apr. 13-15—American Supply & Machinery Manufacturers Assn., Inc., annual convention, Miami, Fla. Association headquarters are at 814 Clark Bldg., Pittsburgh.

Apr. 13-15—International Acetylene Assn., annual convention, Biltmore Hotel, Atlanta. Association headquarters are at 30 E. 42nd St., New York.

Apr. 15—Cutting Die Institute, semiannual meeting, Sheraton Cadillac Hotel, Detroit. Institute headquarters are at 1643 National Bank Bldg., Detroit.

Apr. 15-16—American Institute of Steel Construction, annual engineering conference, Detroit. Institute headquarters are at 101 Park Ave., New York.

Apr. 15-17 — National Petroleum Assn., semiannual meeting, Cleveland Hotel, Cleveland. Association headquarters are at Munsey Bldg., Washington.

Apr. 16-19—Grinding Wheel Institute & Abrasive Grain Assn., spring meeting, The Homestead, Hot Springs, Va. Institute headquarters are at 2130 Keith Blvd., Cleveland.

Apr. 18-23—National Screw Machine Products Assn., annual meeting, St. Moritz Hotel, New York. Association headquarters are at 2860 E. 130th St., Cleveland.

Apr. 21-22—Metal Powder Assn., annual meeting, and Metal Powder Show, Cleveland Hotel, Cleveland. Association headquarters are at 420 Lexington Ave., New York.

COMING MEETINGS

Conventions, meetings and expositions planned for 1953 by national industrial and trade associations in metalworking.

Apr. 23-25—National Tool & Die Manufacturers Assn., spring meeting, Statler Hotel, Washington. Association headquarters are at 907 Public Square Bldg., Cleveland.

Apr. 27-May 2—Concrete Reinforcing Steel Institute, annual meeting, The Carolina, Pinehurst, N. C. Institute headquarters are at 38 S. Dearborn St., Chicago.

Apr. 27-May 3—Wire Reinforcement Institute, Inc., annual meeting, Carolina Hotel, Pinehurst, N. C. Institute headquarters are at National Press Bldg., Washington.

Apr. 28-30—American Society of Mechanical Engineers, spring meeting, Deshler-Wallick Hotel, Columbus, Ohio. Society headquarters are at 29 W. 39th St., New York.

MAY

May 4—Non-Ferrous Founders' Society, Inc., annual meeting, Chicago. Society headquarters are at 192 N. Clark St., Chicago.

May 4-6—Compressed Air & Gas Institute, spring meeting, King & Prince Hotel, St. Simons Island, Ga. Institute headquarters are at 122 E. 42nd St., New York.

May 4-8—American Foundrymen's Society, annual meeting, Chicago. Society headquarters are at 616 S. Michigan Ave., Chicago.

May 6-8—Industrial Fasteners Institute, annual meeting, Westchester Country Club, Rye, N. Y. Institute headquarters are at 3648 Euclid Ave., Cleveland.

May 11 - 13 — National Welding Supply Assn., annual convention, Gibson Hotel, Cincinnati. Association headquarters are at 1900 Arch St., Philadelphia.

May 11-13—Rail Steel Bar Assn., annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters are at 38 S. Dearborn St., Chicago.

May 11-14—American Mining Congress, Coal Convention & Exposition, Public Auditorium, Cleveland. Headquarters are at 1200-18th St., Washington.

May 18-19—Assn. of Iron & Steel Engineers, spring conference, Statler Hotel, Buffalo. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

May 18-20—Industrial Furnace Manufacturers Assn., Inc., annual meeting, The Homestead, Hot Springs, Va. Association headquarters are at 412 Fifth St., N.W., Washington.

May 20-22—Gas Appliance Manufacturers Assn., annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 60 E. 42nd St., New York.

May 24-26—American Steel Warehouse Assn., Inc., annual meeting, The Shoreham, Washington. Association head quarters are at 442 Terminal Tower, Cleveland.

May 24-27—Aluminum Wares Assn., annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.

May 24-27 — Copper & Brass Research Assn., annual meeting, The Homestead, Hot Springs, Va., Association headquarters are at 420 Lexington Ave., New York.

May 24-28—Scientific Apparatus Makers Assn., annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 20 N. Wacker Drive, Chicago.

May 25-27 — Hydraulic Institute, spring meeting, Seaview Country Club, Absecon, N. J. Institute headquarters are at 122 E. 42nd St., New York.

May 25-28—National Assn. of Purchasing Agents, annual meeting, Los Angeles. Association headquarters are at 11 Park Place, New York.

May 27-28—American Iron & Steel Institute, annual meeting, Waldorf-Astoria Hotel, New York. Institute headquarters are at 350 Fifth Ave., New York.

JUNE

June 1-3—American Gear Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va. Association headquarters are at Empire Bldg., Pittsburgh.

June 1-4—Edison Electric Institute, annual convention, Atlantic City, N. J. Institute headquarters are at 420 Lexington Ave., New York.

June 7-12—Society of Automotive Engineers, Inc., summer meeting, Ambassador & Ritz-Carlton Hotels, Atlantic City, N. J. Society headquarters are at 29 W. 39th St., New York.

June 8-10 — Machinery Dealers' National Assn., annual convention, Cleveland, Hotel, Cleveland. Association headquarters are at 1346 Connecticut Ave., Washington.

June 15-18—American Electroplaters' Society, annual convention, Benjamin Franklin Hotel, Philadelphia. Society headquarters are at 445 Broad St., Newark.

June 16-19—American Welding Society, national spring meeting, and welding and allied industry exposition, Shamrock Hotel, Houston. Society headquarters are at 33 W. 39th St., New York.

June 28-30—Alloy Casting Institute, annual meeting, The Homestead, Hot Springs, Va. Institute headquarters are at 32 Third Ave., Mineola, N. Y.

June 28-July 2—American Society of Mechanical Engineers, semiannual meeting, Statler Hotel, Los Angeles. Society headquarters are at 29 W. 39th St., New York.

June 29-July 3 — American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia.

JULY

July 23-24—Truck Trailer Manufacturers Assn., annual summer meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 1024 National Press Bldg., Washington.

July 30-Aug. 1—National Tool & Die Manufacturers Assn., summer meeting, Milwaukee. Association headquarters are at 907 Public Square Bldg., Cleveland.

SEPTEMBER

Sept. 13-17—Electrochemical Society, fall meeting, Wrightsville Beach, N. C. Society headquarters are at 235 W. 102nd St., New York.

Sept. 16-18 — National Petroleum Assn., annual meeting, Traymore Hotel, Atlantic City, N. J., Association headquarters are at Munsey Bldg., Washington.

Sept. 21-23—American Mining Congress, metal and nonmetallic mineral mining convention, Olympic Hotel, Seattle. Headquarters are at 1200 - 18th St., Washington.

Sept. 21-23—Truck Body & Equipment Assn., Inc., Sheraton - Gibson Hotel, Cincinnati. Association headquarters are at 1122 Dupont Circle Bldg., Washington.

Sept. 21-25—Instrument Society of America, national instrument conference and exhibit, Chicago. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

Sept. 28-Oct. 1—Assn. of Iron & Steel Engineers, annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

OCTOBER

Oct. 5-7—American Society of Mechanical Engineers, fall meeting, Sheraton Hotel, Rochester, N. Y. Society headquarters are at 29 W. 39th St., New York.

Oct. 8-9—Gray Iron Founders' Society, annual meeting, New Hotel Jefferson, St. Louis. Society headquarters are at 210 National City-E. 6th Bldg., Cleveland.

Oct. 15-17—Foundry Equipment Manufacturers Assn., annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at Engineers Bldg., Cleveland.

Oct. 19-21—American Gear Manufacturers Assn., semiannual meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at Empire Bldg., Pittsburgh.

Oct. 19-21 — American Standards Assn., annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 70 E. 45th St., New York.

Oct. 19-21—Hydraulic Institute, fall meeting, Edgewater Beach Hotel, Chicago. Institute headquarters are at 122 E. 42nd St., New York.

Oct. 21—Assn. of Lift Truck & Portable Elevator Manufacturers, annual meeting, Yale Club, N. Y. Association headquarters are at P. O. Box 66, Medfield, Mass.

Oct. 21-22—Steel Shipping Container Institute, fall meeting, New York City. Institute headquarters are at 600 Fifth Ave., New York.

Oct. 22-25—National Tool & Die Manufacturers Assn., annual meeting, Berkeley-Carteret Hotel, Asbury Park, N. J. Association headquarters are at 907 Public Square Bldg., Cleveland.

Oct. 26-29—American Gas Assn., annual convention, Kiel Auditorium, St. Louis. Association headquarters are at 420 Lexington Ave., New York.

NOVEMBER

Nov. 9-12—National Electrical Manufacturers Assn., annual meeting, Haddon Hall Hotel, Atlantic City, N. J. Association headquarters are at 155 E. 44th St., New York.

Nov. 18-20—National Metal Trades Assn., annual convention, Statler Hotel, Cleveland. Association headquarters are at 122 South Michigan Ave., Chicago.

Nov. 20—Assn. of American Railroads, annual meeting, Chicago. Association headquarters are at Transportation Bldg., Washington.

Nov. 29-Dec. 4—American Society of Mechanical Engineers, annual meeting, Statler Hotel, New York. Society headquarters are at 29 W. 39th St., New York.

Nov. 30-Dec. 3—American Institute of Steel Construction, annual convention, Boca Raton Club, Boca Raton, Fla. Institute headquarters are at 101 Park Ave., New York.

DECEMBER

Dec. 13-16—American Institute of Chemical Engineers, annual meeting, Jefferson Hotel, St. Louis. Institute headquarters are at 120 E. 41st St., New York.

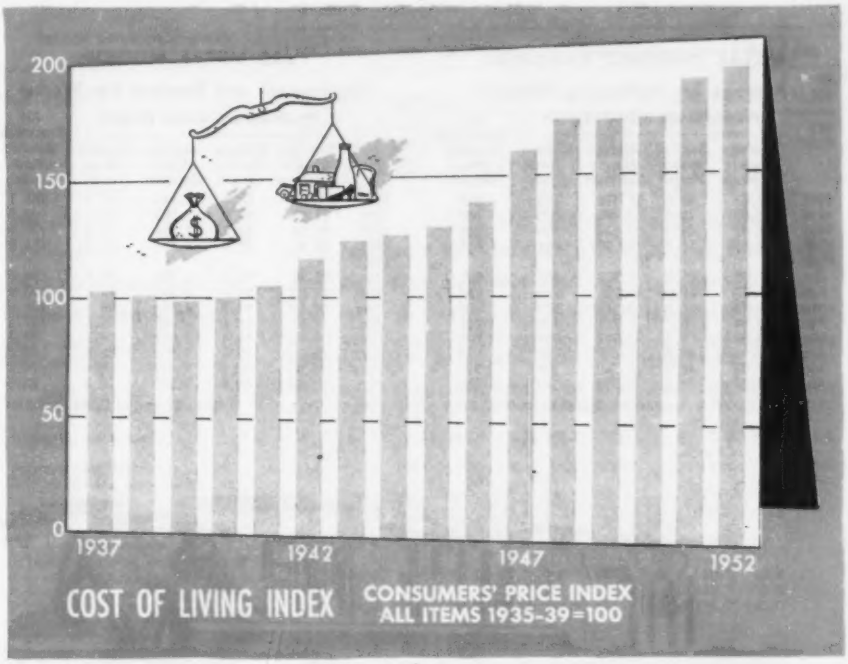
The Iron Age

METAL INDUSTRY FACTS

SECTION 8

EMPLOYMENT AND EARNINGS

PRICE INDEX • METALWORKING PLANT CENSUS DATA



IN THIS SECTION:

EARNINGS

Page

Aluminum ... 485
Coke & byproducts ... 484
Durable goods ... 480
Metal mining ... 480
Metal products ... 480
Metalworking machinery ... 485
Mfg., Index ... 484
Spendable weekly ... 485
Steel ... 480
Transportation ... 485

EMPLOYMENT

Aluminum refining ... 485
By selected industries ... 481
Coke and byproducts ... 484
Iron Age Census ... 486, 487, 488
Durable goods ... 480
Electrical machinery ... 482, 487
Fabricated metal products ... 486
Federal civilian ... 483
Instruments ... 488
Machinery, except electrical ... 487
Metal furniture ... 486
Metal mining ... 480
Metal products ... 480
Metalworking, Iron Age Census ... 486
Mfg., all types ... 483
Mfg., by states ... 482
Mfg., Index ... 484
Mfg., Turn-Over Rates ... 484
Miscellaneous ... 488

Page

Ordnance equipment ... 486
Steel ... 480
Transportation ... 485, 488
U. S. labor force ... 481

FEDERAL EMPLOYEES

Executive ... 483
Legislative ... 483
Payrolls ... 483
Workers ... 483

HOURS, AVG. WEEKLY

Electrical machinery ... 482
Metalworking machinery ... 485
Steel ... 480
Transportation ... 485

Page

NUMBER OF PLANTS ... 486, 487, 488

PRICE INDEX

Consumer goods, large cities ... 483

SAFETY

Accidents ... 485
Deaths, by industry ... 485
Death rates, occupational ... 485
Injuries, by industry ... 484

UNEMPLOYMENT

Time lost, strikes ... 482

WAGES

All manufacturing ... 483

WORK STOPPAGES ... 482

8 LABOR DATA

Employment, average hours and earnings, steel industry . . . All metal mining . . . Durable goods . . . Metal products

METAL PRODUCT EARNINGS

Average For Fabricated Products

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$56.68	40.6	$1.396	812	976
1949	57.82	39.6	1.460	701	859
1950	63.42	41.4	1.532	776	933
1951	69.35	41.7	1.663	831	1,007
1952:					
Jan.	71.06	41.8	1.700	804	987
Feb.	71.27	41.8	1.705	805	988
Mar.	71.43	41.7	1.713	807	989
Apr.	69.64	40.7	1.711	806	989
May	70.95	41.3	1.718	798	981
June	70.18	40.9	1.716	788	970
July	67.83	39.9	1.700	726	911
Aug.	70.34	40.8	1.724	767	954

Source: Bureau of Labor Statistics

ALL METAL MINING

Employment and Earnings Per Worker

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$80.80	42.4	$1.434	94.7	105.1
1949	61.55	40.9	1.505	89.0	100.1
1950	65.58	42.2	1.554	89.4	101.0
1951	74.60	43.6	1.711	92.5	104.9
1952:					
Jan.	79.12	44.3	1.786	94.1	106.9
Feb.	79.25	44.1	1.797	93.8	106.6
Mar.	80.59	44.5	1.811	94.1	106.8
Apr.	77.67	43.1	1.802	94.5	107.5
May	80.45	44.4	1.812	94.3	107.3
June	79.32	42.6	1.862	66.9	80.1
July	78.96	42.2	1.871	60.6	74.1
Aug.	82.20	44.6	1.843	80.3	93.5

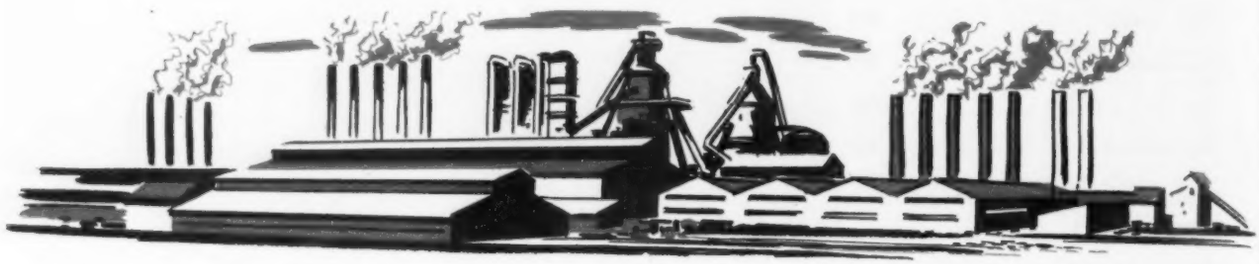
Source: Bureau of Labor Statistics

DURABLE GOODS INDUSTRIES

Employment and Earnings Per Worker

	All Employees	Production and Related Workers			
	Number (thousands)	Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	8,315	6,909	$57.11	40.5	$1.410
1949	7,465	6,096	58.03	39.5	1.469
1950	8,008	6,622	63.32	41.2	1.537
1951	8,926	7,334	69.97	41.7	1.678
1952:					
Jan.	8,950	7,267	72.15	41.8	1.726
Feb.	8,990	7,292	72.18	41.7	1.731
Mar.	9,035	7,316	72.81	41.7	1.746
Apr.	9,045	7,321	71.07	40.8	1.742
May	8,991	7,262	71.76	41.1	1.746
June	8,675	6,939	71.98	41.2	1.747
July	8,301	6,559	70.05	40.4	1.540
Aug.	8,904	7,134	72.92	41.2	1.787

Source: Bureau of Labor Statistics



STEEL—EMPLOYMENT, AVERAGE HOURS AND EARNINGS

Reported by Companies Having More Than 93 Pct of the Total Employment of the Steel Industry

Year	Employees Receiving Wages					Employees Receiving Salaries			All Employees Receiving Wages and Salaries				
	Number of Employees	Total Hours Worked	Average hrs. per Week per Employee	Total Wages	Average Earnings per hr. (Cents)	Number of Employees	Total Hours Worked	Total Salaries	Number of Employees	Total Hours Worked	Average hrs. per Week per Employee	Total Wages and Salaries	Average Earnings per hr. (Cents)
1952:													
Jan.	538,311	98,752,557	41.4	$186,549,816	195.8	101,041	18,631,401	$47,800,451	639,352	117,383,958	41.4	$241,137,632	205.4
Feb.	539,546	91,454,679	40.9	170,842,772	194.2	101,651	18,122,349	46,968,427	641,197	109,577,028	41.3	224,529,578	204.9
March	537,228	94,731,915	39.8	177,924,467	195.0	102,145	18,327,282	47,350,552	639,373	113,059,197	39.9	232,050,655	205.2
April	534,538	86,514,040	37.7	160,914,756	193.8	102,494	18,512,398	47,941,707	637,032	105,026,438	38.4	215,643,301	205.3
May	527,910	84,442,974	38.1	159,670,645	197.1	102,414	18,239,303	46,904,668	630,324	102,682,277	36.8	213,329,125	207.8
June*													
July*													
Aug.	524,491	88,722,523	38.2	180,753,916	213.9	103,134	18,544,476	49,607,773	627,625	107,266,999	38.6	239,345,550	223.1
Sept.	537,524	92,749,792	40.3	195,976,156	220.6	103,312	18,540,397	52,923,497	640,836	111,290,189	40.6	257,537,820	231.4
1951	540,365	1,132,329,539	40.2	2,202,684,299	194.5	97,962	212,340,490	552,468,529	638,327	1,344,670,029	40.4	2,755,152,828	204.9
1950	505,309	1,023,132,181	39.0	1,785,910,384	174.6	88,952	191,262,399	491,042,287	592,261	1,214,394,580	39.3	2,276,952,661	184.2
1949	491,615	814,655,294	34.5	1,506,465,668	170.3	82,209	188,549,627	432,827,472	580,824	1,073,204,921	35.4	1,939,293,140	180.7
1948	503,351	1,028,519,481	39.1	1,675,913,068	162.9	88,199	191,044,219	412,845,319	591,547	1,219,563,700	39.4	2,088,758,385	171.3
1947	489,138	984,410,347	38.6	1,489,531,509	151.3	84,531	183,172,600	368,726,376	573,669	1,167,582,947	39.0	1,858,257,885	159.2
1946	458,259	838,870,389	35.0	1,133,503,371	135.4	79,889	173,301,314	317,760,089	538,148	1,010,171,703	36.0	1,451,263,460	143.7
1945	438,825	1,009,033,709	44.1	1,268,048,553	125.7	76,178	175,093,573	278,038,234	515,003	1,184,127,282	44.1	1,546,086,787	130.6
1944	456,682	1,112,029,921	46.6	1,365,342,466	122.8	76,989	178,320,937	276,170,922	533,651	1,290,350,858	46.3	1,640,513,388	127.1
1943	487,187	1,089,760,555	42.9	1,242,032,184	114.0	77,121	168,264,429	251,002,372	564,308	1,258,024,984	42.8	1,493,034,556	118.7
1942	511,414	1,036,968,871	38.9	1,101,787,008	106.3	71,511	151,390,870	226,941,787	582,925	1,188,359,741	39.1	1,328,728,795	111.8
1941	507,306	1,019,103,012	38.5	980,845,190	96.2	63,430	133,933,316	196,892,173	570,736	1,153,036,328	38.7	1,177,737,363	102.1
1940	453,990	857,770,926	36.1	733,364,058	85.5	57,338	122,522,777	169,864,608	511,328	980,293,703	36.7	903,228,666	92.1
1939	396,220	719,125,101	34.8	608,310,659	84.6	53,421	113,744,629	153,456,397	449,641	832,869,730	35.5	761,767,056	91.5
1938	360,365	518,406,035	27.6	433,372,123	83.6	52,742	107,763,785	143,236,899	413,107	626,169,820	29.1	576,609,022	92.1
1937	479,022	918,354,646	36.8	756,950,364	82.4	55,132	121,459,120	161,161,935	534,154	1,039,813,766	37.3	918,112,299	88.3

* No data, due to steel strike.

Source: American Iron and Steel Institute

Total employment in various industries: Mining, construction, manufacturing . . . Labor force, including unemployment.

LABOR DATA 8

CIVILIAN U. S. LABOR FORCE

Employment Status, Est. (000 omitted)

Average	Total Labor Force[1]	Civilian Labor Force	Employment	Unemployment
1930	50,080	49,820	45,480	4,340
1931	50,680	50,420	42,400	8,020
1932	51,250	51,000	38,940	12,060
1933	51,840	51,590	38,760	12,830
1934	52,490	52,230	40,890	11,340
1935	53,140	52,870	42,260	10,610
1936	53,740	53,440	44,410	9,030
1937	54,320	54,000	46,300	7,700
1938	54,950	54,610	44,220	10,390
1939	55,600	55,230	45,750	9,480
1940	56,030	55,640	47,520	8,120
1941	57,380	55,910	50,350	5,560
1942	60,230	56,410	53,750	2,660
1943	64,410	55,540	54,470	1,070
1944	65,890	54,630	53,960	670
1945	65,140	53,860	52,820	1,040
1946	60,820	57,520	55,250	2,270
1947	61,698	60,188	58,027	2,142
1948	62,748	61,442	59,378	2,064
1949: Jan.	61,548	60,078	57,414	2,664
Feb.	61,896	60,388	57,167	3,221
Mar.	62,305	60,814	57,647	3,167
April	62,327	60,835	57,819	3,016
May	63,452	61,983	58,694	3,289
June	64,866	63,398	59,619	3,778
July	65,278	63,815	59,720	4,095
Aug.	65,105	63,637	59,974	3,689
Sept.	64,222	62,763	59,411	3,351
Oct.	64,021	62,576	59,001	3,576
Nov.	64,363	62,927	59,518	3,409
Dec.	63,475	62,045	58,556	3,489
Aver.	63,571	62,105	58,709	3,395
1950: Jan.	62,835	61,427	56,947	4,480
Feb.	63,003	61,637	56,953	4,684
Mar.	63,021	61,675	57,551	4,123
April	63,513	62,183	58,668	3,515
May	64,108	62,788	59,731	3,057
June	68,177	64,866	61,482	3,384
July	65,742	64,427	61,214	3,213
Aug.	66,204	64,867	62,367	2,500
Sept.	65,020	63,567	61,226	2,341
Oct.	65,438	63,704	61,764	1,940
Nov.	65,453	63,512	61,271	2,240
Dec.	64,674	62,538	60,308	2,229
Aver.	64,606	63,090	59,957	3,142
1951[2]				
Jan.		61,514	59,010	2,503
Feb.		61,313	58,905	2,407
Mar.		62,325	60,179	2,147
April		61,789	60,044	1,744
May		62,803	61,193	1,609
June		63,783	61,803	1,980
July		64,382	62,526	1,856
Aug.		64,208	62,630	1,578
Sept.		63,186	61,580	1,606
Oct.		63,452	61,836	1,616
Nov.		63,184	61,336	1,848
Dec.		62,688	61,014	1,674
Aver.		62,884	61,005	1,879
1952[2]				
Jan.		61,780	59,726	2,054
Feb.		61,838	59,752	2,086
Mar.		61,518	59,714	1,804
April		61,744	60,132	1,612
May		62,778	61,176	1,602
June		64,390	62,572	1,818
July		64,176	62,234	1,942
Aug.		63,958	62,354	1,604
Sept.		63,698	62,260	1,438
Oct.		63,146	61,862	1,284
Nov.		63,646	62,228	1,418

[1] Total labor force consists of the civilian labor force and the armed forces. However, about 150,000 persons in the armed forces in April 1940 who were stationed outside continental U. S. and who were not enumerated in the 1940 Census of Population are excluded from the total labor force. Figures since 1940 have correspondingly been reduced by 150,000 for purposes of comparability.

[2] Monthly total labor force figures are not available. Beginning with January 1951, total labor force is not shown because of the security classification of the Armed Forces component.

Sources: Bureau of Labor Statistics; Bureau of Census

EMPLOYEES IN SELECTED INDUSTRY GROUPS (000 Omitted)

Industry Group and Industry	Annual Average			1952							
	1951	1950	1949	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Total Employees	46,401	44,124	43,001	45,913	45,899	46,001	46,299	46,329	46,348	46,037	46,916
Mining	920	904	932	909	902	904	896	893	828	797	868
Metal	104.9	101.0	100.1	106.9	107.2	106.8	107.3	107.3	80.1	76.8	103.0
Iron	37.6	35.5	33.7	37.1	36.9	36.9	38.0	38.8	11.2	9.7	.....
Copper	28.7	28.1	27.3	28.9	29.1	29.2	29.2	29.0	29.6	28.5	.....
Lead and zinc	20.8	19.7	20.6	22.2	22.4	22.2	22.2	21.9	21.5	20.4	.....
Anthracite	69.1	75.1	77.3	67.0	61.8	66.8	60.1	65.8	65.1	60.8	.....
Bituminous-coal	378.2	375.8	399.0	367.0	366.0	362.8	358.5	348.4	305.3	278.7	318.0
Crude petroleum and natural gas	262.2	255.3	258.0	267.4	266.8	266.1	267.4	268.3	271.3	274.5	.....
Nonmetallic mining and quarrying	105.1	97.4	98.4	100.8	100.7	101.4	104.8	105.5	105.8	105.7	107.0
Contract construction	2,569	2,318	2,156	2,316	2,308	2,296	2,416	2,522	2,663	2,722	2,778
Manufacturing	15,931	14,884	14,148	15,776	15,859	15,869	15,795	15,654	15,463	15,196	15,891
Durable goods	8,926	8,008	7,485	8,946	9,010	9,035	9,054	8,991	8,675	8,334	8,789
Nondurable goods	7,005	6,876	6,681	6,830	6,849	6,834	6,741	6,663	6,788	6,862	7,102
Ordnance and accessories	46.7	24.7	24.0	69.2	71.7	74.3	76.3	78.3	79.7	79.4	84.0
Primary metal industries	1,345	1,220	1,101	1,354	1,354	1,350	1,338	1,335	951	922	1,244
Blast furnace, steel works, and rolling mills	650.5	614.1	550.4	657.6	659.2	656.8	646.5	644.6	278.0	271.5	.....
Iron and steel foundries	279.9	231.8	217.0	277.4	275.0	272.1	270.7	270.6	265.6	251.5	.....
Primary smelting and refining of nonferrous metals	56.3	54.6	52.3	56.3	56.9	56.8	56.9	57.2	57.3	57.1	.....
Rolling, drawing, and alloying of nonferrous metals	100.3	96.9	87.0	100.5	99.9	100.5	100.6	100.6	98.9	95.5	.....
Nonferrous foundries	109.6	93.0	75.8	111.1	111.7	111.9	113.3	113.4	112.7	112.0	.....
Other primary metal industries	147.7	129.8	118.4	150.8	151.5	151.9	149.7	148.6	138.7	134.6	.....
Fabricated metal products (except ordnance and transportation)	1,007	933	859	986	989	989	990	981	970	922	944
Tin cans and other tinware	49.0	48.4	45.8	44.7	44.4	45.4	46.7	48.8	48.8	48.4	.....
Cutlery, hand tools, and hardware	159.7	156.9	142.3	151.1	150.6	148.4	148.9	147.2	145.5	132.6	.....
Heating apparatus (except electric) and plumbers' supplies	154.8	150.6	132.0	143.8	144.9	144.7	144.4	142.0	144.8	142.1	.....
Fabricated structural metal products	229.8	201.4	198.5	240.9	241.9	243.2	243.3	241.5	235.3	226.7	.....
Metal stamping, coating, and engraving	179.7	169.8	147.9	170.4	171.0	172.5	173.4	172.1	172.9	161.3	.....
Other fabricated metal products	233.8	206.1	192.4	235.3	236.2	235.2	233.1	230.8	222.7	210.8	.....
Machinery (except electrical)	1,591	1,352	1,311	1,647	1,655	1,658	1,660	1,648	1,640	1,580	1,565
Engines and turbines	91.3	72.6	72.5	100.1	100.5	100.7	100.8	100.2	103.2	100.4	.....
Agricultural machinery and tractors	187.3	172.4	181.3	189.6	190.9	186.6	191.4	190.9	189.9	165.6	.....
Construction and mining machinery	120.7	100.7	101.3	130.9	132.3	133.5	133.3	132.4	131.0	128.3	.....
Metalworking machinery	289.8	220.2	208.7	310.0	311.8	312.9	312.9	311.1	311.3	305.7	.....
Special-industry machinery (except metal-working machinery)	195.6	167.6	171.8	193.1	191.8	194.3	192.9	190.8	191.0	188.9	.....
General industrial machinery	229.7	188.5	186.4	240.1	242.1	242.6	241.8	237.8	237.5	233.8	.....
Office and store machines	104.5	90.9	90.6	107.8	107.7	107.7	108.1	107.6	107.4	104.3	.....
Service industry and household machines	171.2	176.2	145.4	167.4	170.5	173.2	174.3	172.4	164.9	161.6	.....
Miscellaneous machinery parts	201.2	162.7	153.2	208.0	207.2	206.5	204.6	203.4	203.7	191.4	.....
Electrical machinery	937	836	759	965	970	967	960	955	952	927	950
Electrical generating, transmission, distribution, and industrial apparatus	367.6	317.3	295.2	378.3	380.9	379.8	376.9	374.1	373.8	357.9	.....
Electrical equipment for vehicles	81.0	70.1	64.5	82.5	82.3	81.7	81.5	82.8	81.4	76.3	.....
Communication equipment	339.8	309.2	271.1	362.4	366.5	367.3	364.1	362.6	361.9	359.0	.....
Electrical appliances, lamps, and miscellaneous products	149.0	139.8	128.3	141.4	139.8	138.3	137.3	135.9	134.8	133.3	.....
Transportation equipment	1,511	1,273	1,212	1,560	1,584	1,602	1,629	1,648	1,669	1,517	1,558
Automobiles	856.3	839.4	769.0	775.0	776.9	796.6	809.8	812.9	818.0	668.7	.....
Aircraft and parts	456.3	275.3	255.6	566.4	581.0	586.1	591.9	588.2	610.8	622.9	.....
Aircraft	308.3	184.2	169.7	377.5	386.6	390.2	395.1	399.9	407.9	417.5	.....
Aircraft engines and parts	89.6	54.5	51.8	116.1	120.4	120.7	120.9	121.6	123.5	124.2	.....
Aircraft propellers and parts	10.7	8.1	7.9	12.7	12.9	13.2	13.4	13.5	13.9	14.0	.....
Other aircraft parts and equipment	47.7	28.7	26.2	60.1	61.1	62.0	62.5	63.2	65.5	67.2	.....
Ship and boat building and repairing	113.7	84.4	100.3	131.0	138.9	142.5	144.8	150.1	152.1	150.5	.....
Ship building and repairing	99.7	71.4	88.2	116.8	123.8	126.1	126.8	130.7	131.5	129.2	.....
Railroad equipment	72.4	62.2	76.1	76.6	75.7	76.0	71.9	75.5	76.3	63.8	.....
Other transportation equipment	11.7	11.4	10.9	11.1	11.2	11.2	10.9	11.0	11.1	11.2	.....
Instruments and related products	299	250	238	316	319	321	323	320	321	322	325
Ophthalmic goods	27.6	25.4	26.8	27.5	27.4	27.7	27.7	27.5	27.1	26.9	.....
Photographic apparatus	60.1	51.3	52.6	63.7	64.1	64.4	64.7	64.9	65.7	66.8	.....
Watches and clocks	34.3	30.1	31.4	35.5	35.8	36.0	36.4	36.3	36.3	36.0	.....
Professional and scientific instruments	177.3	143.4	127.1	189.4	191.3	192.4	193.9	191.0	192.3	192.2	.....
Miscellaneous manufacturing	480	459	426	453	461	463	461	458	460	454	475
Jewelry, silverware, and plated ware	51.4	54.8	55.4	45.7	46.2	45.9	45.4	44.0	44.0	42.7	.....
Toys and sporting goods	73.5	73.3	68.7	64.5	67.0	68.9	70.1	72.3	75.8	76.1	.....
Costume jewelry, buttons, notions	56.7	58.2	57.7	52.6	54.5	53.8	51.1	49.2	50.2	50.8	.....
Other miscellaneous manufacturing	300.4	272.3	243.8	290.6	293.2	293.9	294.6	292.3	289.8	284.6	.....

Source: Bureau of Labor Statistics

DATA

Employment in manufacturing industries . . . electrical machinery earnings . . . work stoppages, men involved, days idle

EMPLOYEES, MANUFACTURING BY STATES

Annual Averages for 1950 and 1951. Monthly Averages Thru August 1952 (In Thousands)

State	Annual Average 1950	Annual Average 1951	1952 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Alabama	213.5	226.2	230.3	232.4	231.7	230.3	229.5	203.7	204.1	228.2	232.0
Arizona	14.9	19.2	21.6	22.3	23.0	23.2	23.6	23.7	27.7	27.7	29.0
Arkansas	74.2	80.1	76.0	75.6	74.1	74.8	75.9	76.2	76.6	76.8	78.2
California	758.8	870.4	905.1	915.6	924.1	934.3	938.7	945.8	970.6	1,038.9	1,028.9
Colorado	57.3	63.6	65.9	65.4	65.3	63.7	64.0	57.4	59.1	68.2	70.1
Connecticut	371.2	416.7	427.9	429.7	429.2	426.7	425.3			422.0	429.0
Delaware	46.4	50.8	55.4	55.9	56.1	57.3	57.8	59.1	58.3	63.4	64.5
District of Col.	16.0	17.1	17.5	17.4	17.3	17.3	17.4	17.3	17.4	17.3	17.3
Florida	95.0	105.4	113.0	112.5	113.1	111.1	108.8	106.0	102.9	103.6	105.1
Georgia	281.8	303.6	301.5	301.7	301.0	300.3	301.9	301.2	296.7	305.9	309.3
Idaho	21.8	23.8	19.0	18.7	18.7	20.0	22.1	24.9	27.8	29.5	28.4
Illinois	1,157.0	1,212.9	1,240.0	1,246.3	1,249.4	1,244.9	1,229.8	1,215.5	1,192.2	1,230.7	1,244.6
Indiana	563.1	595.6	612.1	612.2	615.3	610.2	599.2	588.3	520.9	608.2	638.8
Iowa	148.4	167.1	169.3	169.6	168.6	167.8	167.2	168.3	169.3	164.0	164.9
Kansas	92.2	116.8	129.1	130.4	131.7	132.3	130.9	136.6	134.0	136.0	139.9
Kentucky	138.9	151.4	151.7	148.8	144.9	144.0	143.9	149.2	136.1	145.6	145.8
Louisiana	135.9	148.1	144.0	144.2	141.7	143.8	146.5	150.1	149.8	152.4	154.7
Maine	107.7	116.5	115.3	115.8	112.1	106.9	111.1	118.6	120.1	123.1	122.7
Maryland	215.5	254.4	252.2	252.9	255.1	251.9	254.6	241.5	242.5	280.4	276.5
Massachusetts	701.3	735.4	721.7	721.6	717.1	707.4	699.1	701.0	693.6	713.1	717.6
Michigan	1,065.5	1,110.4	1,050.9	1,050.5	1,054.0	1,066.7	1,065.9	1,064.8	989.2	1,003.3	
Minnesota	194.9	206.6	204.7	205.6	205.8	205.6	206.2	205.8	215.1	219.4	223.5
Mississippi	84.9	93.5	92.4	91.9	93.0	93.7	93.6	95.5	95.0	96.0	98.4
Missouri	347.8	373.0	377.7	380.8	383.2	383.6	382.7	389.1	373.9	392.1	404.1
Montana	18.2	17.5	17.6	17.2	17.4	17.4	18.0	18.4	19.0	19.2	19.7
Nebraska	49.8	55.6	57.3	56.1	58.9	58.6	59.4	58.5	61.1	61.1	62.0
Nevada	3.2	3.7	3.7	3.6	3.7	3.7	3.8	3.9	4.0	4.1	4.0
New Hampshire	77.4	82.8	82.5	82.3	81.4	79.3	79.2	80.2	79.8	81.2	81.3
New Jersey	724.5	765.4	756.4	762.2	763.4	760.5	758.4	760.0	745.4	769.5	784.0
New Mexico	11.5	13.8	13.9	14.0	14.4	14.5	14.8	14.9	15.7	16.1	16.2
New York	1,621.5	1,934.0	1,956.3	1,974.7	1,975.8	1,931.2	1,908.0	1,890.2	1,888.7	1,981.9	2,042.9
North Carolina	414.8	432.2	427.8	424.4	417.3	415.8	413.0	416.8	415.5	436.0	445.0
North Dakota	6.0		6.2	6.0	5.9	6.0	6.2	6.4	6.6	6.5	6.5
Ohio	1,183.6	1,281.0	1,273.7	1,274.6	1,272.8	1,273.2	1,265.7	1,247.1	1,154.0	1,247.8	1,298.0
Oklahoma	65.9	73.3	77.3	77.7	77.4	77.7	75.1	77.9	78.3	79.4	80.7
Oregon	135.6	144.6	123.9	126.6	132.6	140.7	130.1	154.8	153.5	160.4	155.3
Pennsylvania	1,403.3	1,494.1	1,475.6	1,476.4	1,474.5	1,457.8	1,452.4	1,262.0	1,253.6	1,464.1	1,502.6
Rhode Island	145.7	150.9	145.2	147.0	145.1	141.6	137.2	137.6	135.0	140.5	146.1
South Carolina	206.3	218.6	216.3	215.0	216.3	216.3	214.6	215.9	216.8	221.8	222.3
South Dakota	11.2	11.6	11.4	11.3	11.4	11.3	11.5	11.8	11.5	11.3	11.2
Tennessee	245.9	256.7	260.9	260.9	263.0	262.2	265.2	267.4	266.9	273.4	276.7
Texas	351.6	397.9	412.2	416.0	414.6	414.1	411.1	413.7	416.1	420.7	423.6
Utah	28.5	31.3	29.0	29.2	29.3	30.1	26.7	26.7	27.8	32.7	36.5
Vermont	35.7	39.0	38.4	38.9	38.8	38.4	37.5	37.2	36.8	37.7	37.9
Virginia	226.2	241.8	244.0	242.6	241.6	240.8	239.7	239.9	241.1	249.7	249.9
Washington	169.3	190.3	176.0	180.6	182.7	185.6	175.5	187.8	202.2	207.5	212.8
West Virginia	137.3	139.9	134.6	133.3	133.1	133.1	133.4	130.7	129.1	135.5	137.5
Wisconsin	426.8	459.7	449.7	453.8	451.1	456.7	456.7	464.2	468.3	453.6	475.6
Wyoming	6.1	6.2	6.4	6.2	6.2	6.3	6.3	6.5	7.2	7.2	7.2

Source: Bureau of Labor Statistics

ELECTRICAL MACHINERY

Employment and Earnings Per Worker

	Production and Related Workers: Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	All Employees Number (thousands)
1948	$55.66	40.1	$1.388	656	869
1949	56.96	39.5	1.442	552	750
1950	60.83	41.1	1.480	636	836
1951	66.86	41.4	1.615	710	937
1952:					
Jan.	70.22	41.9	1.676	724	963
Feb.	69.93	41.6	1.681	726	967
Mar.	70.43	41.5	1.697	722	967
Apr.	69.03	40.7	1.696	714	960
May	68.82	40.6	1.695	706	955
June	69.35	40.7	1.704	705	952
July	67.91	39.9	1.702	685	937
Aug.	69.94	40.9	1.710	708	963

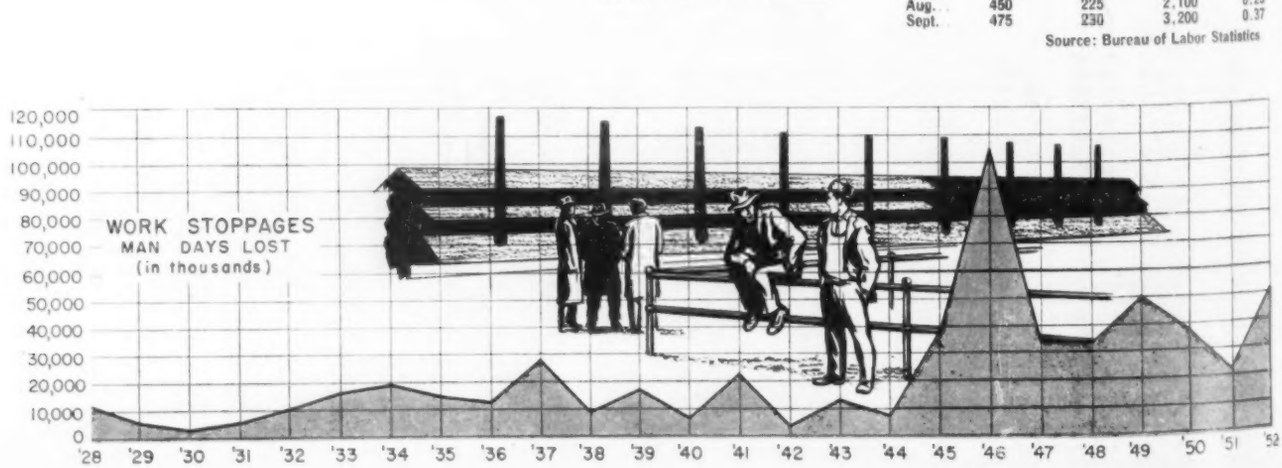
Source: Bureau of Labor Statistics

WORK STOPPAGES—1928-1952

Workers Involved and Man-days Idle

	Work Stoppages Beginning in Period: Number	Workers Involved Number (thousands)	Man-days Idle (all stoppages): Number (thousands)	Per Worker Involved
1928	604	314	12,600	40.2
1929	921	289	5,350	18.5
1930	637	183	3,320	18.1
1931	810	342	6,890	20.2
1932	841	324	10,500	32.4
1933	1,695	1,170	16,900	14.4
1934	1,856	1,470	19,600	13.4
1935	2,014	1,120	15,500	13.8
1936	2,172	789	13,900	17.6
1937	4,740	1,860	28,400	15.3
1938	2,772	688	9,150	13.3
1939	2,613	1,170	17,800	15.2
1940	2,508	577	6,700	11.6
1941	4,288	2,360	23,000	9.8
1942	2,968	840	4,180	5.0
1943	3,752	1,980	13,500	66.8
1944	4,956	2,120	8,720	4.1
1945	4,750	3,470	38,000	11.0
1946	4,985	4,600	116,000	25.2
1947	3,693	2,170	34,600	15.9
1948	3,419	1,960	34,100	17.4
1949	3,606	3,030	50,500	16.7
1950	4,843	2,410	38,800	16.1
1951	4,737	2,220	22,900	10.3
1952:				
Jan.	400	190	1,250	0.14
Feb.	350	185	1,270	0.15
Mar.	400	240	1,400	0.17
Apr.	475	1,000	5,300	0.61
May	475	300	7,500	0.90
June	425	170	14,000	1.68
July	425	125	12,500	1.44
Aug.	450	225	2,100	0.25
Sept.	475	230	3,200	0.37

Source: Bureau of Labor Statistics



Manufacturing employment and wages . . . Federal civilian payroll, number and wages . . . Consumer price index, in cities.

LABOR DATA

FEDERAL CIVILIAN PAYROLLS

For U. S. and All Areas (000 omitted)

Year and Month	All Areas — All Branches
1948	$6,223,486
1949	8,699,270
1950	7,028,907
1951	9,994,796
1952: January	846,065
February	801,375
March	807,727
April	826,343
May	826,104
June	827,347
July	880,590
Continental United States	
1948	$5,731,115
1949	6,234,345
1950	6,591,936
1951	8,482,056
1952: January	797,797
February	755,244
March	759,261
April	778,491
May	776,713
June	778,081
July	826,794

Source: Bureau of Labor Statistics.

FEDERAL CIVILIAN WORKERS

Totals, Continental and All Areas

Year and Month	All Branches	Executive Total	Legislative	Judicial
Total (including areas outside continental United States)				
1948	2,066,152	2,055,397	7,273	3,482
1949	2,100,407	2,089,151	7,661	3,595
1950	2,080,500	2,068,600	8,100	3,800
1951	1,465,900	2,453,700	8,300	3,900
1952: Jan.	2,524,300	2,512,100	8,300	3,900
Feb.	2,537,500	2,525,200	8,300	4,000
Mar.	2,550,900	2,538,500	8,400	4,000
Apr.	2,559,200	2,548,700	8,500	4,000
May	2,571,300	2,558,700	8,700	3,900
June	2,582,900	2,570,200	8,700	4,000
July	2,619,100	2,606,400	8,700	4,000
Aug.	2,621,500	2,608,900	8,700	3,900
Sept.	2,610,400	2,597,700	8,800	3,900
Continental United States				
1948	1,846,840	1,836,158	7,273	3,409
1949	1,921,903	1,910,724	7,661	3,518
1950	1,930,500	1,918,700	8,100	3,700
1951	2,296,900	2,284,800	8,300	3,800
1952: Jan.	2,350,000	2,337,800	8,300	3,900
Feb.	2,362,900	2,350,700	8,300	3,900
Mar.	2,373,500	2,361,200	8,400	3,900
Apr.	2,380,800	2,368,400	8,500	3,900
May	2,390,000	2,377,400	8,700	3,900
June	2,399,900	2,387,200	8,700	3,900
July	2,434,700	2,422,100	8,700	3,900
Aug.	2,437,100	2,424,600	8,700	3,800
Sept.	2,425,900	2,413,300	8,800	3,800

Source: Bureau of Labor Statistics

CONSUMERS' PRICE INDEX IN LARGE CITIES

For Moderate-Income Families by Group of Selected Commodities, 1935-39 = 100

Period	All Items	Food	Apparel	Rent	Total	Fuel, Electric	House Furnishings	Miscellaneous
1914	71.8	81.8	69.8	92.2	62.3	62.3	80.7	51.9
1915	72.5	80.9	71.4	92.9	62.5	62.5	83.6	53.8
1916	77.9	90.8	78.3	94.0	65.0	65.0	76.9	56.3
1917	91.6	116.9	94.1	93.2	72.4	72.4	82.8	65.1
1918	107.5	134.4	127.5	94.9	84.2	84.2	108.4	77.8
1919	123.8	149.8	168.7	102.7	91.1	91.1	134.1	87.6
1920	143.3	169.8	201.0	120.7	108.9	109.9	164.6	100.5
1921	127.7	128.3	154.8	138.8	114.0	114.0	138.5	104.3
1922	119.7	110.9	125.6	142.7	113.1	113.1	117.5	101.2
1923	121.9	124.0	126.9	146.4	115.2	115.2	126.1	100.8
1924	122.2	122.8	124.9	151.6	113.7	113.7	124.0	101.4
1925	125.4	132.9	122.4	152.2	115.4	115.4	121.5	102.2
1926	126.4	137.4	120.6	150.7	117.2	117.2	118.8	102.6
1927	124.0	132.3	118.3	148.3	115.4	115.4	115.9	103.2
1928	122.6	130.8	116.5	144.8	113.4	113.4	113.1	103.8
1929	122.5	132.5	116.3	141.4	112.5	112.5	111.7	104.6
1930	119.4	126.0	112.7	137.5	111.4	111.4	108.9	105.1
1931	108.7	103.9	102.8	130.3	108.9	108.9	98.0	104.1
1932	97.6	86.5	90.8	116.9	103.4	103.4	88.4	101.7
1933	92.4	84.1	87.9	100.7	100.0	100.0	84.2	98.4
1934	95.7	93.7	96.1	94.4	101.4	101.4	92.8	97.9
1935	98.1	100.4	98.8	94.2	100.7	100.7	94.8	98.1
1936	99.1	101.3	97.6	96.4	100.2	100.2	96.3	98.7
1937	102.7	105.3	102.8	100.9	100.2	100.2	104.3	101.0
1938	100.8	97.8	102.2	104.1	99.9	99.9	103.3	101.5
1939	99.4	95.2	100.5	104.3	99.0	99.0	101.3	100.7
1940	100.2	96.6	101.7	104.6	99.7	99.7	100.8	101.1
1941	105.2	105.5	106.3	106.2	102.2	102.2	107.3	104.0
1942	116.5	123.9	124.2	108.5	105.4	105.4	122.2	110.9
1943	123.6	136.0	129.7	108.0	107.7	107.7	125.6	115.8
1944	125.5	138.1	138.8	108.2	109.8	109.8	126.4	121.3
1945	128.4	139.1	115.9	108.3	110.3	110.3	145.8	124.1
1946	139.3	159.6	180.2	108.6	112.4	112.4	159.2	128.8
1947	159.2	193.8	185.8	111.2	121.1	121.1	184.4	139.9
1948	171.9	210.2	198.0	117.4	133.9	133.9	195.8	149.9
1949	170.2	201.9	190.1	126.4	137.5	137.5	189.0	154.8
1950	171.9	204.5	187.7	131.0	140.6	.....	190.2	158.5
1951	185.6	227.4	204.5	136.2	144.1	.....	210.9	165.4
1952: Jan.	189.1	232.4	204.6	139.7	145.0	.....	209.1	169.6
Feb.	187.9	227.5	204.3	140.2	145.3	.....	208.6	170.2
Mar.	188.0	227.6	203.5	140.5	145.3	.....	207.6	170.7
Apr.	188.7	230.0	202.7	140.8	145.3	.....	206.2	171.1
May	189.0	230.8	202.3	141.3	144.6	.....	205.4	171.4
June	189.6	231.5	202.0	141.6	144.8	.....	204.4	172.5
July	190.8	234.8	201.4	141.9	146.4	.....	204.2	173.0
Aug.	191.1	235.5	201.1	142.3	147.3	.....	204.2	173.2
Sept.	190.8	233.2	202.3	142.4	147.6	.....	205.0	173.8
Oct.	190.9	232.4	202.1	143.0	148.4	.....	204.6	174.4

Source: Bureau of Labor Statistics

ALL MANUFACTURING EMPLOYMENT AND WAGES

For Production and Related Workers, Average Employment, Hours and Earnings

	All Manufacturing Employees	Production and Related Workers					
			Indexes (1947-49 = 100)				
	Number (thousands)	Number (thousands)	Adjusted Employment	Unadjusted Payroll	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1940	10,780	8,811	71.2	34.0	$25.20	38.1	$0.661
1941	12,974	10,877	87.9	49.3	29.58	40.6	.729
1942	15,051	12,854	103.9	72.2	36.65	42.9	.853
1943	17,381	15,014	121.4	99.0	43.14	44.9	.961
1944	17,111	14,607	118.1	102.8	46.06	45.2	1.019
1945	15,302	12,864	104.0	87.8	44.39	43.4	1.023
1946	14,461	12,105	97.9	81.2	43.82	40.4	1.086
1947	15,247	12,794	103.4	97.7	49.97	40.4	1.237
1948	15,286	12,717	102.8	105.1	54.14	40.1	1.350
1949	14,146	11,597	93.8	97.2	54.92	39.2	1.401
1950	14,951	12,264	99.2	111.2	59.33	40.5	1.465
1951	15,932	13,034	105.4	129.2	64.88	40.7	1.594
1952: Jan.	15,776	12,766	103.6	130.4	66.91	40.8	1.640
Feb.	15,859	12,820	103.8	131.0	66.91	40.7	1.644
Mar.	15,869	12,815	103.7	131.9	67.40	40.7	1.656
Apr.	15,795	12,733	104.0	128.1	65.87	39.8	1.655
May	15,654	12,588	103.4	128.1	66.65	40.2	1.658
June	15,463	12,383	101.2	126.8	67.15	40.4	1.658
July	15,196	12,110	99.6	121.7	65.76	39.9	1.648
Aug.*	15,891	12,798	102.7	130.5	67.80	40.6	1.670

* Preliminary.

Source: Bureau of Labor Statistics

8 LABOR DATA

Injury rates by industries . . . Index of plant workers . . . Employment in coke industry . . . Labor turn-over rates

INJURY RATES BY INDUSTRY—1951

Permanent and Temporary Disabilities by Frequency and Severity

Industry	Number of Units	Frequency Rates: Fatal, Permanent Total	Permanent Partial Disability	Temporary Total Disability	All Disabilities	Rank (All Cases)	Severity Rates: Rate	Rank
All Reporting Industries, 1950	6,395	.08	.57	8.65	9.30	..	.94	..
All Reporting Industries, 1951	7,134	.09	.53	8.44	9.06	..	.97	..
Aircraft Manufacturing	34	.05	.49	4.91	5.45	8	.63	14
Air Transport	10	.06	.21	15.45	15.72	31	.56	12
Automobile	202	.03	.51	3.95	4.49	4	.46	9
Cement	146	.19	.66	3.37	4.22	3	1.84	33
Chemical	573	.09	.32	5.07	5.48	9	.85	19
Clay Products	131	.08	.77	21.93	22.78	38	1.49	32
Communications	58	.01	.01	1.77	1.79	1	.09	1
Construction	535	.30	.54	20.08	20.92	35	2.48	35
Electrical Equipment	198	.02	.43	3.59	4.04	2	.37	7
Electric Utilities	246	.25	.30	10.51	11.06	25	2.00	34
Food	477	.03	.87	13.31	14.21	28	1.00	22
Foundries	135	.08	.94	15.19	16.21	33	1.29	30
Gas Utilities	434	.11	.38	15.23	15.72	32	1.04	24
Glass	56	.02	.75	4.63	5.40	7	.67	15
Leather	56	.11	.51	11.86	12.48	27	1.08	25
Lumber	96	.40	1.69	41.03	43.12	40	4.52	38
Machinery	307	.02	.98	8.09	9.09	18	.58	13
Marine Transport	47	.58	.49	21.42	22.49	37	4.40	37
Meat Packing	77	.02	.52	10.31	10.85	23	.47	11
Mining, Coal	162	.71	1.30	32.11	34.12	39	6.77	40
Mining, Other Than Coal	275	.47	.94	20.68	22.09	36	4.14	36
Misc. Iron & Steel Products	292	.06	.72	11.21	12.09	26	.90	20
Misc. Manufacturing	71	.00	.74	5.51	6.25	12	.32	5
Non-Ferrous Metals & Prods.	99	.09	1.12	9.63	10.84	22	1.26	27
Petroleum	269	.15	.34	10.01	10.50	21	1.29	31
Printing & Publishing	51	.02	.44	8.66	9.12	19	.45	8
Pulp and Paper	378	.06	.80	10.04	10.90	24	.97	21
Quarry	238	.55	.94	13.91	15.40	30	4.54	39
Railroad Equipment	25	.09	.92	9.05	10.06	20	1.29	29
Railroads	....	....	....	....	15.03	..	....	..
Rubber	107	.01	.36	5.54	5.91	11	.36	6
Service	61	.00	.30	8.15	8.45	16	.27	4
Sheet Metal	137	.02	.91	5.99	6.92	14	.67	16
Shipbuilding	33	.06	.32	4.43	4.81	6	.75	17
Steel	132	.11	.66	3.73	4.50	5	1.18	28
Storage & Warehousing	90	.16	.31	8.60	9.07	17	1.27	28
Textile	232	.01	.68	6.20	6.89	13	.47	10
Tobacco	24	.00	.19	5.44	5.63	10	.15	2
Transit	235	.07	.22	14.90	15.19	29	.84	18
Wholesale & Retail Trade	44	.01	.05	7.83	7.89	15	.19	3
Wood Products	107	.03	1.13	18.36	19.53	34	1.03	23

Source: National Safety Council

INDEXES OF PLANT WORKERS

Manufacturing Employment, Payrolls

(1947–1949 average = 100)

	Employment	Weekly Payroll
1940: Average	71.2	34.0
1941: Average	87.9	49.3
1942: Average	103.9	72.2
1943: Average	121.4	98.0
1944: Average	118.1	102.8
1945: Average	104.0	87.8
1946: Average	97.9	81.2
1947: Average	103.4	97.7
1948: Average	102.8	108.1
1949: Average	93.8	97.2
1950: Average	99.2	111.2
1951: Average	105.4	129.2
1952: Jan.	103.2	130.4
Feb.	103.6	131.0
Mar.	103.6	131.9
Apr.	102.9	128.1
May	101.8	128.1
June	99.7	128.4
July	97.5	121.1
Aug.	104.1	133.3
Sept.	106.9	141.5

Source: Bureau of Labor Statistics

COKE, BYPRODUCTS INDUSTRY

Employment and Earnings Per Worker

	All Employees: Number (thousands)	Production and Related Workers: Number (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	20.0	17.5	$58.56	39.7	$1.475
1949	19.5	16.9	61.07	39.3	1.554
1950	20.8	18.1	62.85	39.7	1.583
1951	21.8	18.8	69.47	39.9	1.741
1952:					
Jan.	22.0	18.8	70.05	39.6	1.769
Feb.	22.1	18.8	70.46	39.9	1.766
Mar.	22.5	19.2	69.48	39.5	1.759
Apr.	22.4	19.1	68.53	38.5	1.780
May	22.6	19.2	68.25	38.6	1.773
June	14.7	11.6	65.87	38.6	1.790
July	17.3	8.4	72.28	39.8	1.816
Aug.	20.5	16.4	73.68	39.4	1.870

Source: Bureau of Labor Statistics

LABOR TURN-OVER RATES IN MANUFACTURING INDUSTRIES

Per 100 Employees, By Class of Turn-Over Per Month

Class of Turn-Over and Year	January	February	March	April	May	June	July	August	September	October	November	December
Total Accession:												
1952	4.4	3.9	3.9	3.7	3.9	4.9	4.4	5.9	5.7	....	....	....
1951	5.2	4.5	4.6	4.5	4.5	4.9	4.2	4.4	4.3	4.4	3.9	3.0
1950	3.6	3.2	3.6	3.5	4.4	4.8	4.7	6.6	5.7	5.2	4.0	3.0
1949	3.2	2.9	3.0	2.9	3.5	4.4	3.5	4.4	4.1	3.7	3.3	3.2
1948	4.6	3.9	4.0	4.0	4.1	5.7	4.7	5.0	5.1	4.5	3.9	2.7
1947	6.0	5.0	5.1	5.1	4.8	5.5	4.9	5.3	5.9	5.5	4.8	3.6
1946	8.5	6.8	7.1	6.7	6.1	6.7	7.4	7.0	7.1	6.8	5.7	4.3
Total Separation:												
1952	4.0	3.9	3.7	4.1	3.9	3.9	5.0	4.6	4.9	....	....	....
1951	4.1	3.8	4.1	4.6	4.8	4.3	4.4	5.2	5.1	4.7	4.3	3.5
1950	3.1	3.0	2.9	2.8	3.1	3.0	2.9	4.2	4.9	4.3	3.8	3.6
1949	4.6	4.1	4.8	4.8	5.2	4.3	3.8	4.0	4.2	4.1	4.0	3.2
1948	4.3	4.2	4.5	4.7	4.3	4.5	4.4	5.1	5.4	4.5	4.1	4.3
1947	4.9	4.5	4.9	5.2	5.4	4.7	4.6	5.3	5.9	5.0	4.0	3.7
1946	6.8	6.3	6.6	6.3	6.3	5.7	5.8	6.6	6.9	6.3	4.9	4.5
Quit:[4]												
1952	1.9	1.9	2.0	2.2	2.2	2.2	2.2	3.0	3.5	....	....	....
1951	2.1	2.1	2.5	2.7	2.8	2.5	2.4	3.1	3.1	2.5	1.9	1.4
1950	1.1	1.0	1.2	1.3	1.6	1.7	1.8	2.9	3.4	2.7	2.1	1.7
1949	1.7	1.4	1.6	1.7	1.6	1.5	1.4	1.8	2.1	1.5	1.2	.9
1948	2.6	2.5	2.8	3.0	2.8	2.9	2.9	3.4	3.9	2.8	2.2	1.7
1947	3.5	3.2	3.5	3.7	3.5	3.1	3.1	4.0	4.5	3.6	2.7	2.3
1946	4.3	3.9	4.2	4.3	4.2	4.0	4.6	5.3	5.3	4.7	3.7	
Discharge:												
1952	.3	.3	.3	.3	.3	.3	.3	.3	.4	....	....	....
1951	.3	.3	.3	.4	.4	.4	.3	.4	.3	.4	.3	.3
1950	.2	.2	.2	.2	.3	.3	.3	.4	.4	.4	.3	.3
1949	.3	.3	.3	.2	.2	.2	.2	.3	.2	.2	.2	.2
1948	.4	.4	.4	.4	.3	.4	.4	.4	.4	.4	.4	.3
1947	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
1946	.5	.5	.4	.4	.4	.3	.4	.4	.4	.4	.4	.4
Lay-off:[4]												
1952	1.4	1.3	1.1	1.3	1.1	1.1	2.2	1.0	.7	....	....	....
1951	1.0	.8	.8	1.0	1.2	1.0	1.3	1.3	1.3	1.4	1.7	1.5
1950	1.7	1.7	1.4	1.2	1.1	.9	.6	.6	.7	.8	1.1	1.3
1949	2.5	2.3	2.8	2.8	3.3	2.5	2.1	1.8	1.8	2.3	2.5	2.0
1948	1.2	1.2	1.2	1.2	1.1	1.1	1.0	1.2	1.0	1.2	1.4	2.2
1947	.9	.8	.9	1.0	1.4	1.1	1.0	.8	.9	.8	.8	.9
1946	1.8	1.7	1.8	1.4	1.5	1.2	.6	.7	1.0	1.0	.7	1.0

[1] Prior to 1943, rates relate to wage earners only.
[2] Preliminary figures.
[3] Prior to September 1940, miscellaneous separations were included with quits.
[4] Including temporary, indeterminate (of more than 7 days' duration) and permanent lay-offs.

Death rate by industry . . . Accidents to workers . . . occupational death rate
Spendable weekly earnings of workers . . .

8 LABOR DATA

TRANSPORTATION EQUIPMENT

Employment and Hours Per Worker

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$61.58	39.0	$1.579	1,031	1,283
1949	64.95	39.2	1.657	987	1,212
1950	71.18	41 0	1 736	1.044	1.273
1951	75.77	40.8	1.857	1,221	1,511
1952:					
Jan.	79.47	41.5	1.915	1,237	1,562
Feb.	79 24	41.4	1.914	1,243	1,574
Mar.	80.08	41.3	1.939	1,266	1,602
Apr.	78.47	40.7	1.928	1,287	1,627
May	79.57	41.1	1.936	1,307	1,648
June	79.12	40.7	1.944	1,322	1,668
July	75.73	39.4	1.922	1,169	1,522
Aug.	78.31	40.2	1.948	1,197	1,553

Source: Bureau of Labor Statistics

DEATH RATES BY INDUSTRY

Deaths of Workers, Major Industries

Industry Group	Total Deaths	Deaths per 100,000 Workers		
		1949	1950	1951
Trade	1,600	12	12	13
Service	2,300	14	14	15
Manufacturing	2,700	16	17	17
Public utilities	300	30	27	24
Transportation	1,400	45	43	47
Agriculture	4,000	54	57	57
Construction	2,500	91	93	93
Mining, quarrying, oil and gas wells	1,200	105	110	129

Source: National Safety Council

ACCIDENTS TO ALL WORKERS

Death and Injury, Place of Accident

Place of Accident	1950		1951	
	Deaths	Injuries	Deaths	Injuries
At work	15.500	1,950,000	16,000	4,600,000
Away from work	32.000	2,550,000	33,000	2,100,000
Motor vehicle	18 000	650,000	19,800	2,500,000
Public non-motor vehicle	7.300	900.000	7,500	950,000
Home	6.700	1,000,000	5,700	850,000

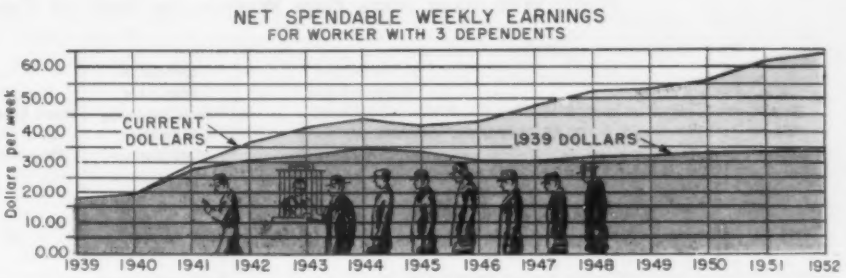
Source: National Safety Council

OCCUPATIONAL DEATH RATES

Deaths Per 100,000 Workers

Year	Deaths	No. of Workers (Millions)	Deaths per 100,000 Workers
1935	16.500	• 43	38
1936	18.500	45	41
1937	19.000	46	41
1938	16.000	44	36
1939	15.500	45	34
1940	17.000	46	37
1941	18.000	49	37
1942	18.500	52	36
1943	17.500	53	33
1944	16.000	52	31
1945	16.500	51	32
1946	16.500	53½	31
1947	17.000	56½	30
1948	16.500	57½	29
1949	15.000	57	26
1950	15 500	58	27
1951	16,000	61½	27

Source: National Safety Council



SPENDABLE WEEKLY EARNINGS OF WORKERS

Gross & Net Average Earnings of Production Workers in Manufacturing Industries[1]

Period	Gross Average Weekly Earnings		Net Spendable Average Weekly Earnings			
			Worker With No Dependents		Worker With 3 Dependents	
	Amount	Index (1939=100)	Current Dollars	1939 Dollars	Current Dollars	1939 Dollars
1939: Average	$23.86	100.0	23.58	23.58	23.62	23.62
1940: Average	25.20	105.6	24.69	24.49	24.95	24.75
1941: Average	29.58	124.0	26.05	26.51	29.28	27.67
1942: Average	36.65	153.6	31.77	27.11	36.28	30.96
1943: Average	43.14	180.8	36.01	28.97	41.39	33.30
1944: Average	46.08	193.1	38.29	30.32	44.06	34.89
1945: Average	44.39	186.0	36.97	28.81	42.74	33.08
1946: Average	43.74	183.3	37.65	26.87	43.13	30.78
1947: Average	49.97	209.4	42.76	26.70	48.24	30.12
1948: Average	54.14	226.9	47.43	27.54	53.17	30.87
1949: Average	54.92	230.2	48.09	28.27	53.83	31.64
1950: Average	59 33	248 7	51 09	29 54	57 21	33 08
1951: Average	64,88	271,9	54.18	29.02	61.41	32.89
1952: Jan.	66 91	280.4	54.85	28.83	62.79	33.01
Feb.	66 91	280 4	54 85	29.02	62 79	33.22
Mar.	67.40	282.5	55.23	29.20	63.17	33.40
Apr.	65.87	276.1	54.06	28.48	61.97	32.64
May	66.65	279.3	54.65	28.74	62 58	32.91
June	67.15	281.4	55.04	28.86	62.98	33.02
July	65.76	275.6	53.97	28.12	61.88	32.24
Aug.	67.80	284.2	55.53	28.88	63.49	33.02
Sept.	70.09	293.8	57.29	29.85	65.30	34.02

[1] Net spendable average weekly earnings are obtained by deducting from gross average weekly earnings, social security and income taxes for which the specified type of worker is liable. The amount of income tax liability depends on the number of dependents supported by the worker as well as on the level of his gross income. Net spendable earnings have, therefore, been computed for 2 types of income-receivers: (1) A worker with no dependents; (2) A worker with 3 dependents.

The computation of net spendable earnings for both the factory worker with no dependents and the factory worker with 3 dependents are based upon the gross average weekly earnings for all production workers in manufacturing industries without direct regard to marital status and family composition. The primary value of the spendable series is that of measuring relative changes in disposable earnings for 2 types of income-receivers. That series does not, therefore, reflect actual differences in levels of earnings for workers of varying age, occupation, skill, family composition, etc.

Source: Bureau of Labor Statistics

REFINING OF ALUMINUM

Earnings Per Worker

Year	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1948	$58.95	41.4	$1.424
1949	61.95	41.3	1.500
1950	63.97	40.9	1.564
1951	70.92	41.5	1.709
1952: Jan.	71.60	41.8	1.713
Feb.	72.19	41.9	1.723
Mar.	72.15	41.8	1.726
Apr.	72.10	41.7	1.729
May	74.42	42.6	1.747
June	72.29	41.5	1.742
July	74.89	42.5	1.762
Aug.	78.39	41.3	1.898

Source: Bureau of Labor Statistics

METALWORKING MACHINERY

(Except Machine Tools)

Employment and Earnings Per Worker

	Production and Related Workers				All Employees
	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Number (thousands)	Number (thousands)
1948	$62.94	42.1	$1.495	186.6	239.5
1949	61.11	39.5	1.547	157.9	208.7
1950	70 54	42 7	1 652	169 0	220.2
1951	81.99	45.2	1.814	226.7	289.8
1952:					
Jan.	84.64	45.7	1.852	245 8	309.5
Feb.	85 97	45 9	1 873	247.6	312.2
Mar.	86.67	46.1	1.880	249.1	312.9
Apr.	83.37	44.7	1.865	248.8	312.9
May	84.66	45.2	1.873	247.0	311.1
June	84.89	45.3	1.874	247.8	312.9
July	80.85	43.7	1.850	242.2	306.1
Aug.	83.75	44.5	1.882	246.5	312.8

Source: Bureau of Labor Statistics

Number of metalworking plants in various plant size-brackets with actual worker employment totals in the industry groups.

THE IRON AGE 1952 CENSUS OF METALWORKING EMPLOYMENT

Plants With 20 or More Plant Workers, by Dept. of Commerce Code Number

Govt. Ind. Code	TITLES OF 4-DIGIT GROUPS	Number of Workers in Plants Employing 20 or More Plant Workers	Number of Plants Employing 20 or More Plant Workers	NUMBER OF PLANTS BY SIZE		
				With 100 or More Plant Workers	With 50 or More Plant Workers	With 20 to 49 Plant Workers
	19—ORDNANCE & ACCESSORIES					
1911-99	Ordnance Equipment	95,376	59	49	56	3
	25—FURNITURE & FIXTURES (METAL)					
2514-99	Metal Furniture	84,398	491	190	357	134
	33—PRIMARY METALS					
3311	Blast Furnaces (Excluding integrated plants)	17,521	33	32	32	1
3312	Steel Works & Rolling Mills	526,619	175	171	174	1
3313	Electrometallurgical Products	6,970	27	23	26	1
3321	Gray Iron Foundries	109,651	822	273	555	267
3322	Malleable Iron Foundries	31,680	78	72	78	0
3323	Steel Foundries	61,457	169	125	149	20
3331-41	Smelting & Refining Nonferrous Metals	55,073	137	84	108	29
3351-59	Rolling, Drawing & Alloying Nonferrous Metals	99,645	149	92	126	23
3361	Nonferrous Foundries	58,061	457	118	238	219
3391	Iron & Steel Forgings	45,712	182	87	121	61
3392	Wire Drawing (Except wire depts. of other mills)	14,705	43	33	39	4
3393	Welded & Heavy Riveted Pipe	12,972	55	35	46	9
3395	Heat Treating (Commercial Shops)	3,199	64	4	20	44
3398	Cold Rolling Mills (Except those at hot mill locations)	15,778	67	39	58	9
3399	Miscellaneous Primary Metal (Other than above)	3,508	46	11	23	23
	34—FABRICATED METAL PRODUCTS					
3411	Tin Cans & Tinware	46,620	148	102	125	23
3421	Cutlery	20,454	105	45	76	29
3422	Edge Tools	7,728	75	19	47	28
3423	Hand Tools (Except edge)	30,268	202	80	145	57
3424	Files	3,803	10	4	6	4
3425	Hand Saws & Saw Blades	8,226	42	10	22	20
3429	Hardware	75,095	328	139	226	102
3431	Metal Sanitary Ware & Plumbers Supplies	46,109	185	89	142	43
3432	Oil Burners	5,946	57	14	34	23
3439	Heating & Cooking Apparatus (Except electric)	97,189	434	229	338	96
3441	Fabricated Structural Steel & Ornamental Metal	74,424	730	160	384	346
3442	Metal Doors, Sash, Frames, Molding & Trim	28,088	195	77	132	63
3443	Boiler Shop Plate Products	65,661	404	157	263	141
3444	Sheet Metal Work	46,863	602	98	274	328
3446	Welding Shops, Jobbing	784	23	1	3	20
3461	Vitreous Enameled Products	19,204	55	42	51	4
3462	Automobile Stampings	57,612	113	65	87	26
3463	Stampings & Pressed Metal (Except auto)	105,415	779	223	444	335
3464	Powder Metallurgy (Molding & sintering)	2,052	23	5	15	8
3465	Enameling, Japanning & Lacquering for Trade	579	13	0	5	8
3466	Galvanized & Hot Dip Coating	1,363	23	3	10	13
3467	Engraving On Metal	1,872	9	6	6	3
3468	Electroplating for Trade	15,833	237	35	104	133
3471	Lighting Fixtures	26,557	213	59	127	86
3481	Nails & Spikes	3,507	26	10	20	6
3489	Wirework and Wire Springs	54,665	375	130	238	137
3491	Metal Shipping Barrels & Drums	11,420	66	35	52	14
3492	Safes & Vaults	2,930	7	4	6	1
3493	Steel Springs for Transportation Vehicles	7,648	38	18	27	11
3494	Bolts, Nuts, Washers, Rivets	40,390	173	88	134	39
3495	Screw Machine Products for Trade	29,867	357	68	198	101
3498	Collapsible Tubes	3,570	15	10	15	0
3497	Foil	2,570	14	9	12	2
3499	Misc. Fabricated Products	11,775	114	28	60	54

Number of metalworking plants in various plant size-brackets with actual worker employment totals in the industry groups.

METALWORKING PLANT CENSUS (continued)

Govt. Ind. Code	TITLES OF 4-DIGIT GROUPS	Number of Workers in Plants Employing 20 or More Plant Workers	Number of Plants Employing 20 or More Plant Workers	NUMBER OF PLANTS BY SIZE		
				With 100 or More Plant Workers	With 50 or More Plant Workers	With 20 to 49 Plant Workers
	35—MACHINERY (EXCEPT ELECTRICAL)					
3511	Steam Engines & Turbines	15,757	22	15	17	5
3519	Internal Combustion Engines (Except auto & aircraft)	57,398	88	62	79	7
3521	Tractors	76,971	40	27	35	5
3522	Agricultural Machinery	84,701	381	157	251	130
3531	Construction & Mining Machinery	78,339	348	175	263	85
3532	Oil-Field Machinery & Tools	29,024	164	63	100	64
3541	Machine Tools	82,130	241	141	199	42
3542	Metalworking Machinery (Except machine tools)	72,601	309	149	226	83
3543	Machine Tool Accessories & Precision Tools	73,281	827	168	390	437
3551	Food-Products Machinery	36,380	282	103	182	80
3552	Textile Machinery	46,079	168	69	116	52
3553	Woodworking Machinery	13,352	125	37	80	45
3554	Paper Mill & Paper Products Machinery	16,571	88	45	61	27
3555	Printing Machinery	20,394	79	46	52	27
3556	Foundry Machinery	4,490	41	8	25	16
3559	Special-Industry Machinery (Other than above)	44,149	352	113	204	148
3561	Pumps & Compressors	55,302	269	118	183	86
3562	Elevators	7,605	52	15	26	26
3563	Conveyors, Cranes & Hoists	22,007	141	53	86	55
3564	Blowers & Fans (Except desk or wall mounted cir.)	9,758	73	27	44	29
3565	Industrial Trucks & Tractors	12,364	60	32	46	14
3566	Mechanical Power Transmission Equipment	55,418	232	113	168	64
3567	Industrial Furnaces & Ovens	8,261	74	26	44	30
3568	Stokers	5,346	29	15	18	11
3569	Other General Industrial Machinery	14,489	126	45	81	45
3571	Computing Machines & Cash Registers	48,912	39	30	34	5
3572	Typewriters	25,861	11	10	11	0
3575	Vending & Coin-Operated Machines	8,822	44	25	34	10
3576	Scales & Balances	6,093	36	17	28	8
3579	Other Office & Store Machines	15,908	57	31	45	12
3581	Domestic Laundry Machines	22,007	35	27	32	3
3582	Commercial Laundry Machines	8,070	48	16	29	19
3583	Sewing Machines	15,135	23	13	18	5
3584	Vacuum Cleaners	10,894	16	11	13	3
3585	Refrigerators & Air Conditioning Equipment	117,921	192	111	156	36
3586	Measuring & Dispensing Pumps	10,671	34	24	30	4
3589	Other Service Industry & Household Machines	8,388	77	25	47	30
3591	Valves & Fittings	67,920	184	98	143	41
3592	Fabricated Pipe Bends, Coils, Nipples	9,683	105	22	61	44
3593	Ball & Roller Bearings	50,869	58	43	51	7
3599	Machine Shops (Jobbing)	28,445	439	59	154	285
	36—ELECTRICAL MACHINERY & EQUIPMENT					
3611	Wiring Devices	40,884	187	92	147	40
3613	Instruments for Measuring Electrical Characteristics	22,411	61	27	43	18
3614	Motors, Generators & Generator Sets	121,510	165	96	136	29
3615	Transformers, Power	32,912	56	27	39	17
3616	Switchgear & Industrial Controls	68,489	168	91	135	33
3617	Electric Welding Apparatus	9,441	56	15	34	22
3619	Other Electrical Equipment for Industrial Use	13,769	54	27	40	14
3621	Electric Appliances (Not elsewhere classified)	62,019	147	77	108	39
3631	Insulated Wire & Cable	24,264	59	45	54	5
3641	Electrical Equipment for Transportation Equipment	86,437	70	47	63	7
3651	Electric Lamps (Bulbs, etc.)	26,821	36	27	31	5
3661	Radio, Phonograph & Related Products (Except tubes)	148,479	304	192	262	42
3662	Radio Tubes	23,480	34	30	32	2
3664	Telephone & Telegraph Equipment	98,179	38	28	34	4
3669	Communication Equipment (Not elsewhere classified)	9,654	33	13	22	11
3691	Storage Batteries	11,745	44	18	29	15
3692	Primary Batteries	3,703	8	6	7	1
3693	X-ray Apparatus & Non-Radio Electronic Tubes	8,507	34	18	25	9
3699	Electrical Products (Not elsewhere classified)	5,544	37	18	28	9

8 LABOR DATA

Number of metalworking plants in various plant size-brackets with actual worker employment totals in the industry groups.

METALWORKING PLANT CENSUS (continued)

Govt. Ind. Code	TITLES OF 4-DIGIT GROUPS	Number of Workers in Plants Employing 20 or More Plant Workers	Number of Plants Employing 20 or More Plant Workers	NUMBER OF PLANTS BY SIZE		
				With 100 or More Plant Workers	With 50 or More Plant Workers	With 20 to 49 Plant Workers
	37—TRANSPORTATION EQUIPMENT					
3711	Motor Vehicles	348,722	103	91	100	3
3712	Passenger-Car Bodies	67,750	26	24	25	1
3713	Truck & Bus Bodies	26,671	172	52	94	78
3714	Motor Vehicle Parts & Accessories	329,109	515	305	405	110
3715	Truck Trailers	11,599	67	32	49	18
3716	Automobile Trailers	7,282	49	22	39	10
3721	Aircraft	284,685	50	46	48	2
3722	Aircraft Engines & Engine Parts	89,363	50	39	46	4
3723	Aircraft Propellers	10,572	9	8	8	1
3729	Aircraft Parts	54,957	127	79	105	22
3731	Shipbuilding	205,373	155	120	142	13
3741	Locomotives & Parts	33,898	20	14	18	2
3742	Railroad & Street Cars	59,302	59	39	52	7
3751	Motorcycles, Bicycles & Parts	12,595	31	18	22	9
3799	Transportation Equipment (Not elsewhere classified)	5,662	31	11	15	16
	38—INSTRUMENTS & PHOTOGRAPHIC EQUIP.					
3811	Lab., Scientific, & Engineering Instruments	19,620	89	32	56	33
3821	Mechanical Measuring & Control Instruments	45,919	170	84	129	41
3831	Optical Instruments	13,295	15	9	13	2
3841	Surgical Instruments	4,515	33	10	23	10
3842	Surgical Appliances	3,666	27	7	21	6
3843	Dental Equipment	5,178	24	12	17	7
3851	Ophthalmic Goods	5,969	14	8	11	3
3861	Photographic Equipment	38,969	60	29	44	16
3871	Watches, Clocks & Parts	31,836	37	26	31	6
3872	Watchcases	5,607	15	10	11	4
	39—MISC. MFG. INDUSTRIES (METAL)					
3911	Jewelry (Precious Metal)	12,633	126	23	67	59
3912	Jewelers' Findings	2,704	32	7	14	18
3914	Silverware & Plated Ware	19,240	63	29	45	18
3931	Pianos	3,804	7	6	7	0
3932	Organs	2,126	10	4	8	2
3939	Musical Instruments, Other	2,990	30	9	18	12
3941	Toys & Games (Metal)	16,230	79	38	56	23
3943	Children's Vehicles	6,017	39	19	31	8
3949	Sporting Goods (Metal)	13,538	70	30	45	25
3951	Mechanical Pencils	10,723	36	19	27	9
3953	Hand Stamps, Stencils, Brands	1,953	30	4	11	19
3961	Costume Jewelry & Novelties	8,720	44	18	28	16
3963	Buttons (Metal)	858	8	3	7	1
3964	Needles, Pins, Zippers	19,150	72	39	58	14
3981	Brushes (Metal)	3,252	16	7	10	6
3986	Jewelry Cases & Instrument Cases	3,314	18	11	15	3
3988	Morticians' Goods (Metal)	5,091	41	17	30	11
3991	Beauty-Shop & Barber-Shop Equipment	2,479	19	6	10	9
3993	Signs & Diaplays	12,557	123	30	53	70
3995	Umbrella Frames	525	2	2	2	0
3997	Soda Fountains	3,271	20	6	14	6
3998	Models & Patterns	2,179	42	4	13	29
3999	Misc. Products (Metal)	14,762	65	29	47	18
	Total for Metalworking Plants Over 20 Plant Workers	6,274,562	19,762	8,263	13,303	6,459

Source: THE IRON AGE "Basic Marketing Data," 1953 Edition

In the preceding pages of statistics every effort has been made to include important data useful to the metalworking and metalproducing industry. A similar effort has been made to exclude data which might be considered of minor importance. However, the editors will appreciate comments on the scope of the material so that any important omissions can be corrected in future issues.—The Editors.

World Steel Production Declines Slightly In 1952

Russian output smashes 3 to 1 production advantage U. S. had enjoyed . . . Gains of other Free World countries maintain production edge over communist dominated countries.

By producing 38.6 million net tons of steel in 1952 Soviet Russia shattered the 3 to 1 advantage in production the U. S. had enjoyed, according to THE IRON AGE, national metalworking weekly. The Russian output represented a gain of about 12 pct over the 34.5 million tons produced by Soviet furnaces in 1951.

World steel production in 1952 was 1.3 million net tons less than it was in 1951. World output in 1952 was 228.6 million tons; in 1951 it was 229.9 million tons. The decline in world production was due largely to loss of more than 19 million tons of production due to strikes in the United States last Summer. The U. S. was the only major steel producing country to show a decline in 1952.

Free World Holds Head—Despite the Soviet gain, increased production in Free World nations other than the U. S. maintained the Free World advantage in steel output over Iron Curtain countries.

Western Germany scored the biggest gain of any Free World nation. Production there in 1952 was 17.3 million net tons, 2.4 million tons more than in 1951. Next biggest gain was scored by France, whose output of 11.7 million net tons was about a million tons higher than the previous year. The United Kingdom produced 18.3 million tons in 1952, a gain of .8 million tons over 1951. Japanese output in 1952 was 7.8 million net tons, up .6 million tons from 1951. Italian production of 3.9 million tons was .5 million tons higher than the year before.

U. S. Comeback — After being put deep in a hole by its longest strike in history (54 days), plus other shorter stoppages, the steel industry in the U. S. scored a great production comeback. Despite production losses from these strikes totaling more than 19 million tons, American steel companies wound up the year with total output of 93.3 million net tons. This is the third best production record in the history of the industry. It is topped only by 105.2 million tons in 1951 and 96.8 million tons in 1950.

Had it not been for the crippling strikes, U. S. production in 1952 might have reached a stratospheric total of 112.3 million tons. This would have been only .2 million tons (only a few hours' production) less than THE IRON AGE said the industry was capable of producing at the beginning of the year.

Big Potential—The outlook for 1953 is very bright. It is estimated that the steel industry can produce as much as 118.8 million net tons—if needed. Acutally, it is doubtful that the industry will be called upon to produce that much, as supply is expected to match demand for a number of finished steel items about the middle of the year—or soon after.

Many in the industry expect the ingot rate to ease moderately in the second half of 1953. But very hard-to-get items, such as large bars, heavy plates and structurals, and oil country goods, are expected to remain tight throughout the year.

Near Goal—The U. S. production potential is backed by increased capacity which THE IRON AGE estimates now totals about 116 million net tons, a gain of well over 7 million tons for the year. By the middle of 1953 the industry should be close to its capacity goal of 120 million tons.

Despite die-hard efforts of the planners to keep controls alive, gradual easing of restrictions is expected to continue. By mid-year the industry should be free of controls, except for simple priorities and directives to assure adequate steel for military and atomic energy uses. Steadily improving supply outlook is expected to keynote decontrol.

Not So Big—Actually, military and atomic energy steel requirements have never mounted as high as predicted by government spokesmen. This is due partly to defense production stretchouts. As now planned, it is expected that these uses will require no more than 14 million tons of steel in 1953, or less than 12 pct of the estimated production potential. This would leave more than 104 million tons for other purposes—one-third more than the 80 million tons which was available for non-defense uses in 1952.

Meanwhile, manufacturers are training more of their big guns on the civilian market, which is expected to be the biggest in history. Knowing that the market for their goods will become more competitive, they are racing to reach consumers first with the most. This is evidenced by their high production targets, and by increasing pressure from their purchasing agents for steel delivery.

Steelmakers are continuing their allout drive for production. They are planning to pay double-time wages to keep major facilities operating through the holidays, the same as last week. It is expected that their efforts will again be rewarded by keeping the ingot rate above 100 pct.

Market Briefs and Bulletins

Steel Shipments—October shipments of finished steel amounted to 7,155,611 net tons, the highest in the nation's history. Shipments of stainless steel, while only a small portion of the total, were considerably higher than ever before at 57,232 tons, reports American Iron & Steel Institute. However, total for the 10 months in 1952 was 11.7 million tons less than for the same period in 1951 because of losses during the steel strikes.

Appliance Sales—Gas appliance sales for the year are estimated at more than $1.2 billion. In making this estimate, James F. Donnelly, president, Gas Appliance Mfrs. Assn., said remodeling of obsolete homes provided a major source of the industry's business last year. It is expected to be even more important in 1953. More than 20 million homes have passed the 30-year mark and will need to have their heating systems renovated.

Coal Dips—Output of bituminous coal in 1952 was estimated at 465 million tons. Although this is 13 pct under the 1951 level, output is still considerably higher than in prewar years, reports Bituminous Coal Institute.

More Sulfur—Sulfur expansion projects in eight countries has increased capacity by more than 900,000 long tons in the last year. The U. S., with 16 new projects, increased its capacity by 700,000 tons.

Sixth Highest—Despite the 54-day steel strike and other work stoppages which caused a loss of about 7 million tons of steel, U. S. Steel Corp. predicts its 1952 output will be the sixth highest in the history of the company.

Boron Steel—Output of boron steel in the first 9 months of 1952 totaled 507,358 tons, 354,495 tons more than was produced in all of 1951, reports American Iron & Steel Institute. Increased use of boron steel is a result of efforts to conserve scarce alloying metals.

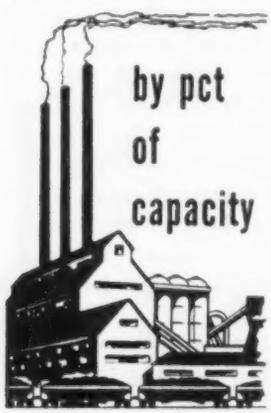
Construction Record—Preliminary government figures indicate 1952 construction rate will be a new record, despite a slight decline during November. Eleven-month total of new construction expenditures is $29.8 billion as compared with $28.5 billion for the same period in 1951.

Another Record—Westinghouse Electric Corp. reports value of its 1952 production at more than $1.4 billion, the greatest volume in the company's history. Company states that since 1946 it has invested $245 million in new plants and improved facilities. By 1955 this investment is scheduled to be $450 million and capacity will have been increased 125 pct.

Armco Adds—Armco Steel Corp. plans to add $12 million worth of new processing facilities to its Ashland, Ky. plant. Included in the new facilities will be a cold reduction mill, a continuous cold strip pickler, and both light and heavy gage Zincgrip lines.

Nearing Completion—Pittsburgh Steel Co.'s expansion program is nearing completion. Program involves increasing ingot capacity by 48 pct and finishing capacity by 82 pct. A new 66-in. blooming-slabbing mill is in operation, and new 66-in. hot and cold rolled sheet mills are scheduled to start in the first and second quarters of 1953, respectively.

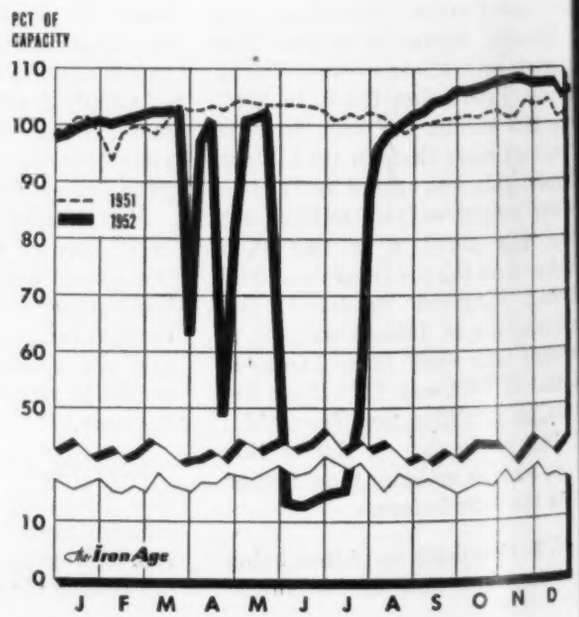
STEEL OPERATIONS



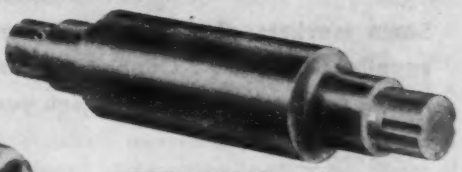
District Operating Rates

District	Week of Dec 28	Week of Dec 21
Pittsburgh	106.0	106.0*
Chicago	109.0	109.0*
Valley	102.0	102.0*
Philadelphia	100.5	100.0
West	102.0	101.0
Buffalo	106.5	103.0
Cleveland	85.0	87.0
Detroit	106.0	99.0
Wheeling	101.0	101.0
Birmingham (South)	107.5	107.5
South Ohio River	71.0	73.0
St. Louis	101.5	88.0*
East	82.5	82.5*
Aggregate	103.5	103.0

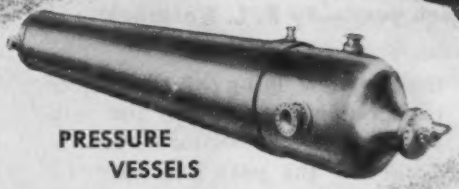
Beginning Jan. 1, 1953, operations are based on annual capacity of 108,587,670 net tons.
* Revised



HEADQUARTERS FOR HEAVY STEEL FORGINGS



STEEL ROLLS



PRESSURE VESSELS

PRESS CYLINDER

RINGS

Whatever your needs for heavy steel forgings in industry, Midvale can assure you of the finest in craftsmanship, precision and ultimate performance. Whether it is weldless gear rings for turbine speed reduction . . . cylinders for hydraulic presses . . . weldless high-pressure vessels for oil refining, gas reactions and steam generation or hardened and ground steel rolls for cold rolling carbon and alloy steel, stainless steel, aluminum, copper, brass, zinc, foil, paper, linoleum, plastics and rubber . . . Midvale engineers can help you design them. Midvale craftsmen, with the most modern equipment, will build them to your most exacting specifications. Put your heavy forging problems in our hands.

THE MIDVALE COMPANY

NICETOWN, PHILADELPHIA, PENNA.

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO

MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Metals to Ease in New Year

Some markets already free, others to follow with greater supplies in '53 . . . Copper may ease by third quarter . . . Nickel to continue tight through year—*By R. L. Hatschek.*

This past year has witnessed many shifts and turns of the metal markets. Some went from famine to feast. Others expected to do the same, continued in famine. Pressure for higher prices was continually in evidence—with a few major exceptions where prices ended the year drastically lower.

Crystal ball gazing is made extremely difficult in these days of price and distribution control, possible labor unrest, and a very jittery world situation. Making it even tougher to forecast is the switch in administrations coming up in a few weeks. The Republicans will be better disposed towards business and industry but Gen. Eisenhower is an independent man and can be counted on to do what he feels is best regardless of whom it seems to favor.

But despite these *ifs* here's the outlook for the New Year:

Aluminum — A year ago we made a wrong prediction that aluminum output in 1952 would pass a million tons. Again we make the prediction—and this time we'll be right. Severe power shortages, even worse than the preceding year, made it impossible in 1952. Even so, production totaled an all-time high of about 939,000 tons—a record that won't last long.

As soon as warmer weather thaws snow lying in the mountains, aluminum production will jump to over 100,000 tons a month. Total for the year will beat 1.2 million tons and may even surpass the 1.3 million-ton mark. Availability for civilian manufacture will be higher—how much higher depending on the rate of stockpiling which will be resumed no later than second quarter. Prices may move up another ½¢ or 1¢ notch with a 4 to 5 pct increase on finished and fabricated forms. This will depend on action now pending and the new Administration.

Copper—The red metal is the only one of the major nonferrous metals which will be short through most of 1953. It could ease by third quarter with intelligent handling of stockpiling and government price control.

Biggest bugaboo in the copper picture is the multiple price situation. Prices now range from 24.5¢ to 36.5¢ per lb with a number of in-betweens. They're all arbitrary. Industry will keep pressing for complete elimination of price controls and they may be successful. The government estimates this move would result in a world price of about 31¢ per lb, industry says 28¢ to 29¢. But it would stay there only as long as demand continues at present levels.

If current Washington thinking prevails, the most probable move would be an increase in the domestic ceiling to about 27.5¢ per lb.

Zinc, Lead—The twin metals, zinc and lead, are the outstanding examples of famine-to-feast markets in 1952. Prices started tumbling early in the year and are now well below their respective ceilings. Demand for them can be expected to increase in the coming year since there will be more consumer products made demanding zinc diecastings and lead batteries, for instance. Demand for galvanizing will also be higher.

Tomorrow is the day for which zinc traders have been waiting and watching. Zinc is to be freed for private trade on the London Metal Exchange. The U.S. market price will now depend largely on the quotation there as has been true of lead since it was freed in October. Expectation (and hope) is that the impact will be considerably lighter.

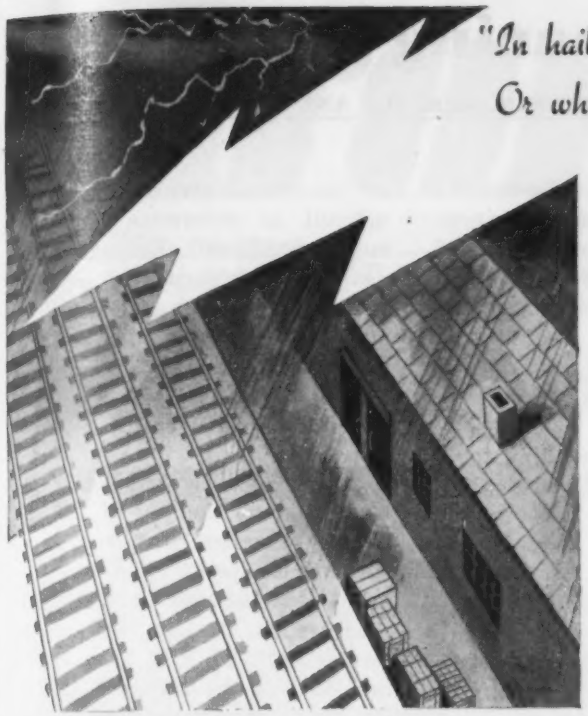
Tin — Supplies of tin in this country have moved steadily upward during the past year and stocks are now plentiful. Decontrol has been strongly favored by industry and may come about soon. Despite nationalization of the tin mines in Bolivia, it is expected that there will be no stop in the flow of tin from that source to the U.S. Bolivian economy is based largely on tin as the prime income source and it's felt this will be insurance enough. It would be no surprise to see tin prices come down from the present perch at $1.21½.

Nickel—Free world nickel supplies, thought to be five times that of the rest of the world, won't improve enough to support defense, stockpiling and unrestricted civilian use in the coming year. Production in 1952 was about 157,500 tons in the free world, about 10,000 tons more than the previous year. Production at Nicaro is now nearing full capacity.

NONFERROUS METAL PRICES

	Dec. 24	Dec. 25	Dec. 26	Dec. 27	Dec. 29	Dec. 30
Copper, electro, Conn.	24.50	....	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	....	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.21½	....	$1.21½	....	$1.21½	$1.21½*
Zinc, East St. Louis	12.50	....	12.50	12.50	12.50	12.50
Lead, St. Louis	14.05	....	14.05	14.05	14.05	14.05

Note: Quotations are going prices.
*Tentative



"In hail or rain or any snow,
Or when the winds blow loudly"

SHIPPING SUPERSTRONG CONTAINERS

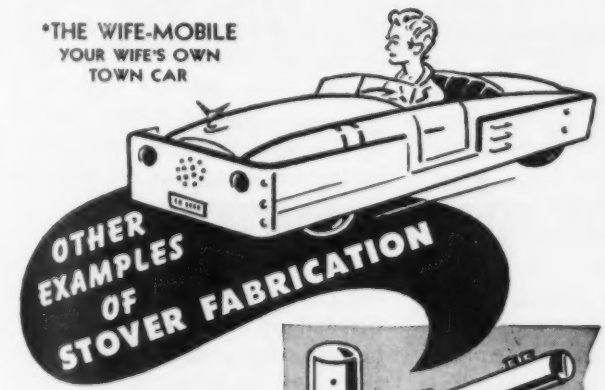
SUPERSTRONG boxes and crates are just what the name implies—tough sturdy shipping containers built to protect your products from the worst of weather or the roughest of handling. They have stood the test in peace and war for nearly a century, and the valuable experience gained in this long period represents the extra something you obtain when you specify SUPERSTRONG.

If you have defense contracts or subcontracts, you will be interested to know that our facilities and equipment enable us to comply fully with Government packaging specifications. Contact us for full information on domestic or export shipping containers.

WIREBOUND BOXES and CRATES
WOODEN BOXES and CRATES
CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS · · · PALLETS

RATHBORNE, HAIR AND RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS
EASTERN SALES OFFICE • 121 NO. BROAD STREET, PHILADELPHIA 7, PA.

If it's made of PLATE STEEL
Stover can make it!



You can bring your steel fabrication to Stover with complete confidence. The Stover technicians are capable of constructing any article made from plate steel, to the most exacting specifications. Stover engineers will gladly go over your plans with you and help set them into production.

STOVER STEEL TANK & MFG. CO.
FREEPORT, ILLINOIS

H & K PERFORATED SCREENS

Screens used in grain testing require an extreme accuracy of diameter for round holes and for dimensions of slotted perforations. Here H & K. screens test only ± .0005 variation in diameter of all the holes per screen. Such accuracy is a part of everyday H & K production.

H & K Screens may also be had to specifications as to kind and temper of metal—or in plastics, rubber, fabrikoids, etc., practically any sheet, coil or plate material. Your inquiry, regardless of specifications, is invited for recommendation and prices.

Remember—H & K Grilles of Beauty for your ornamental applications.

The Harrington & King PERFORATING CO

5657 FILLMORE ST., CHICAGO 44, ILLINOIS,
114 LIBERTY ST. NEW YORK 6, N. Y.

CONSIDER GOOD USED EQUIPMENT FIRST

BELT GRINDING UNIT
Hill Clutch & Machine & Fdry. Co. Open Side Abrasive Belt Grinding Unit. Designed to accommodate slabs up to ⅜" thick x 30" wide x 30' long.

BRAKE—LEAF TYPE
16' x ¾" Dreis & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

CHARGING MACHINE
6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Gasoline Engine, Rubber Tires.

CRANE—GANTRY
5 Ton Whiting Two Leg Gantry Crane 52 Ft. Span Cab Control. Three Motors 220 v. 3 ph. 60 cy.

CRANE—LADLE
75 Ton Morgan Ladle Crane 49'6" Span 4-Girder, With 25 Ton Auxiliary, Complete with 230 Volt D.C. Motors.

FORGING MACHINE
5" Ajax Forging Machine or Upsetter, Motor driven. Equipped with Air Clutch.

FURNACES—MELTING
400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.
15 ton Heroult Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.
25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

HAMMER—COUNTER BLOW TYPE
35 ton Counter Blow Drop Forge Hammer Steam or Air Operated.

LEVELER—ROLLER
60" Aetna-Standard Roller Leveler, Motor Driven. 17 Rolls 4⅜" dia.

PRESS—BRIQUETTING
Model BL-350 Milwaukee Hydraulic Briquetting Press, Complete with Pumps. Capacity Grey Iron Briquettes 3½ tons per hr.

PRESS—KNUCKLE JOINT
1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" stroke, 18" Shut Height.

PRESSES—TRIMMING
1500 ton Hydraulic Bending & Trimming Press, Distance between columns 86" x 86".
2500 ton Hydraulic Bending & Trimming Press, Distance between columns 90" x 108".

ROLLING MILLS
8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.
12½" x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.
18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill. Complete with Elec. Equip.
18" x 60" Three High Roughing Mill, Complete with billet heating furnace and accessory equipment including electrical equipment.
27" x 56" United Two High Skin Pass Mill

SAW
No. 749 Espen Lucas Heavy Duty Cold Saw Capacity up to and including cakes or slabs 48" x 7", Stroke 72", Motor Driven.

SLITTING LINE
76" Mesta Slitter, Complete with Mesta Feed Reel, Mesta Uncoiler and Electrical Equip.

STRAIGHTENERS
No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3½" Bars or 4½" O. D. Pipe or Tubing. NEW 1950.
No. 18 Sutton Round Straightener, Motor Drive, Capacity 3/16" to ¾" O.D. Friction Drive complete with 1/3 H.P. A.C. Motor.

TESTING MACHINE
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

UNIVERSAL IRONWORKER
No. 28U-30 Buffalo Armor Plate Universal Ironworker — Combination Punch, Shear & Bar Cutter. Motor Driven Capacities — Shear 3" Round, 2⅝" Square, 5x1⅝" Flat, 5x5x⅝" Angles 12"—31½# Beams, etc., Punch 1½" thru 1¼".

RITTERBUSH & COMPANY, INC.
50 Church Street, New York 8, N. Y.
Phone—COrt. 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Trend Continued — Downward trend of used machinery business during 1952 was a continuation of a slowdown that first appeared in the last months of 1951. A major factor in the market decline was completion of tooling up operations in plants working on defense contracts.

Orders for used machine tools for defense work slipped rapidly early in the year. By mid-summer DO-related business was just about at an end as far as most dealers were concerned. In addition to meaning a loss of volume, slackening of defense-pressured used tool buying caused a shift in the market buying pattern.

In almost all parts of the country, the demand switch was from the big buyer of specialized machine tools, who was gearing for defense contracts, to the small general purpose machine shop or tool room which wanted light units.

Duller than Usual — Used machinery dealers suffered their traditional summer slump during 1952, but the dog days were made worse in some areas, particularly Pittsburgh and Detroit, by the lengthy steel strike. Manufacturers' production schedules were thrown out of kilter because it was impossible to determine when and if any steel would be available. Many prospective buyers just weren't interested in buying until the strike was settled.

Another factor decreasing activity during 1952 was the uncertainty common in any presidential election year. A lot of manufacturers, instead of going ahead with normal expansion plans, stood by until Nov. 4.

Uniform Loss — Drop in used machinery business seemed about the same in all sections of the country. Detroit may have fared a little better than most areas because of activity in tool and die shops there.

Because no reports are compiled on used machinery business it is difficult to determine just how much business slumped. Some dealers in Chicago area reported volume off as much as 25 pct. Used machine tool men in other sections may be in a similar position, though the general decline is believed to be considerably less.

Study — With the New York-New England Chapter of the Machinery Dealers National Assn. starting its statistical survey program, designed to analyze business trends, dealers in this section will be able to keep better tabs on how the market is faring. Prospects are that a similar program will be adopted eventually by MDNA on a national scale.

A Draw—In its dealings with Washington, used machinery dealers won one battle and lost another. The long awaited amendment to CPR 80, advancing the pricing base date from Jan. 25, 1951 to Dec. 15, 1951 was finally issued. But dealers received a rough beating from the Office of Price Stabilization on the matter of the price book. One date after another was set for issuance of the much needed listing, but the final result has been that dealers had to go throughout the year without this needed information.

For the Future—On prospects for 1953, dealers are pretty evenly divided on what to expect. Some believe the possibility that controls will be lifted in addition to the more understanding treatment expected from Washington will increase business activity. Coupled with this is the easing supply of new machine tools which some dealers think will force more good used tools on the market.

Other dealers evaluating the loss of even more defense related orders, in addition to rumors of a possible business recession in 1953, think the downward trend will continue.